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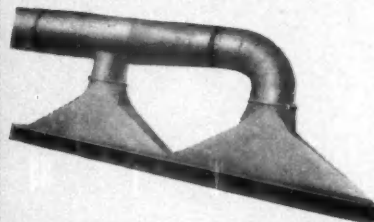
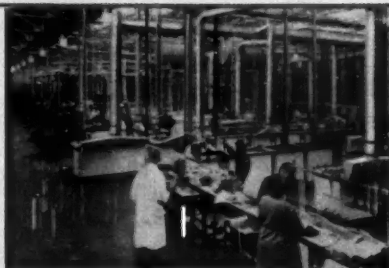
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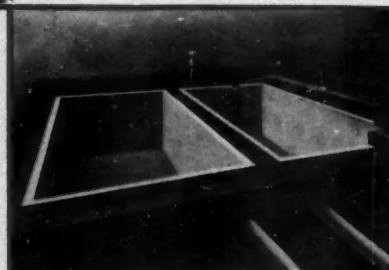
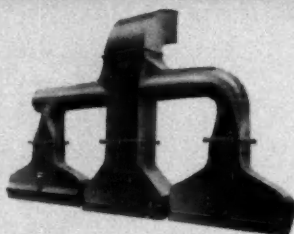
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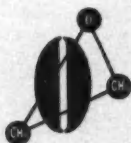
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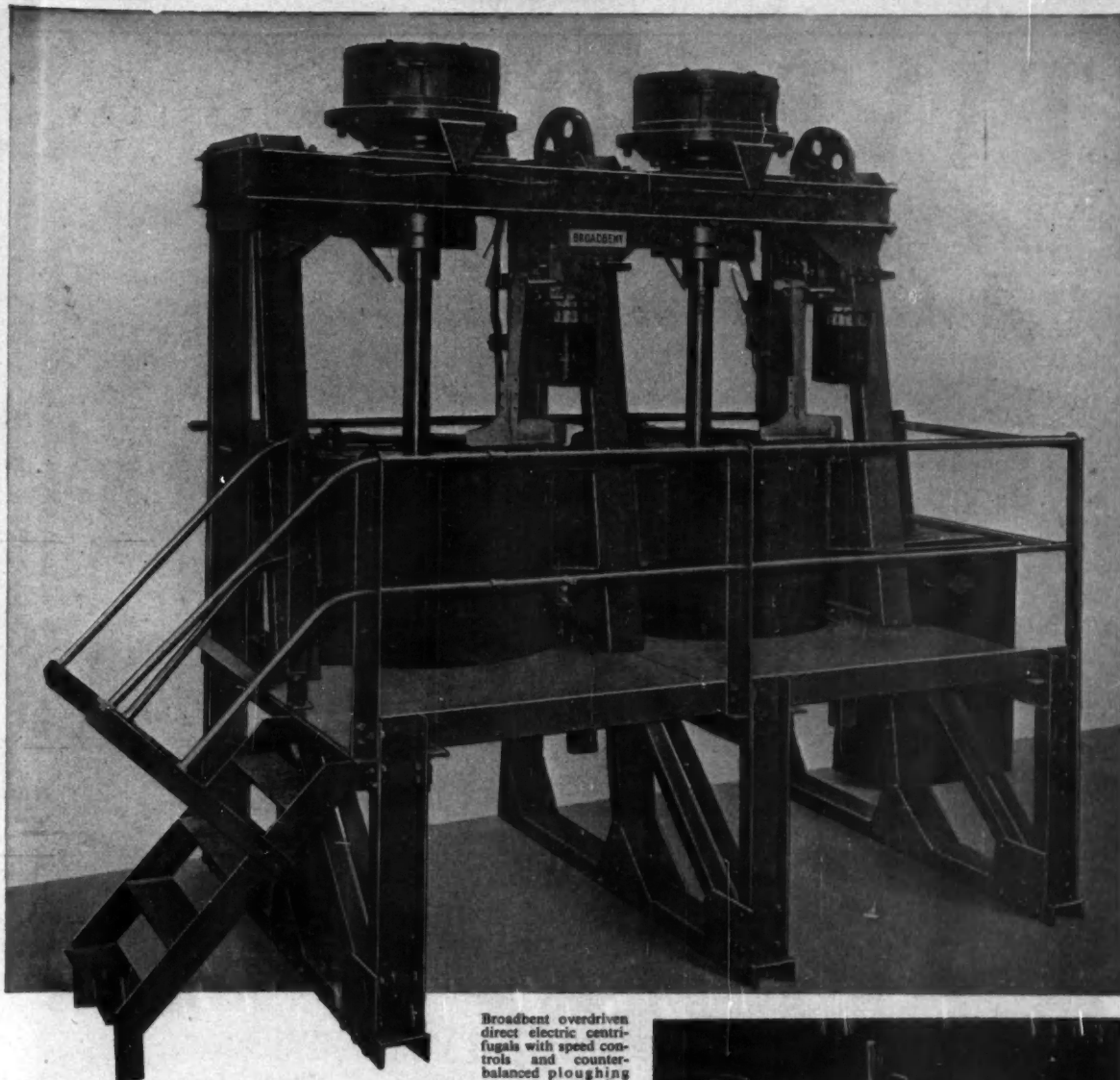
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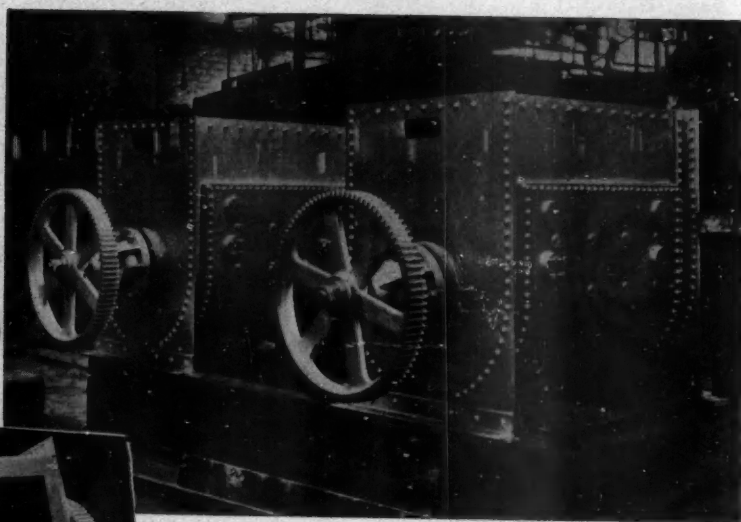
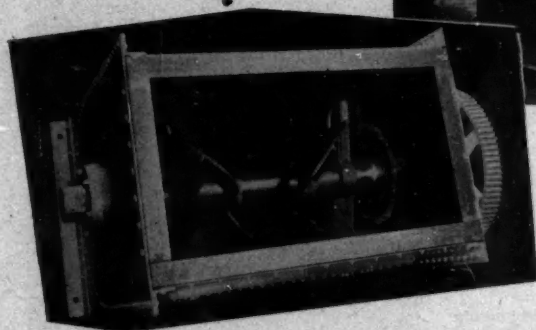
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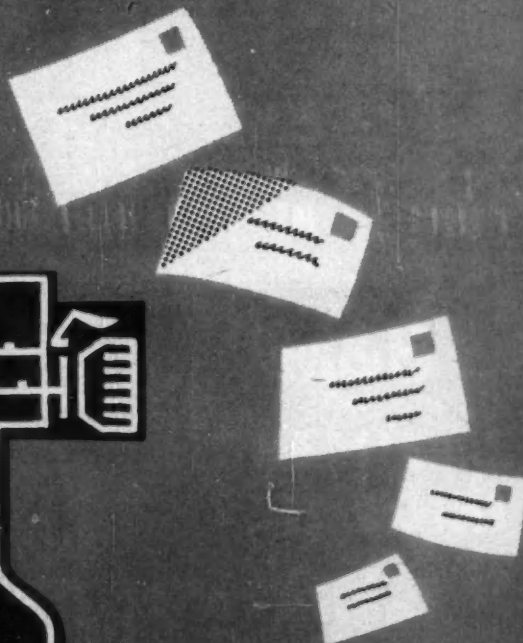
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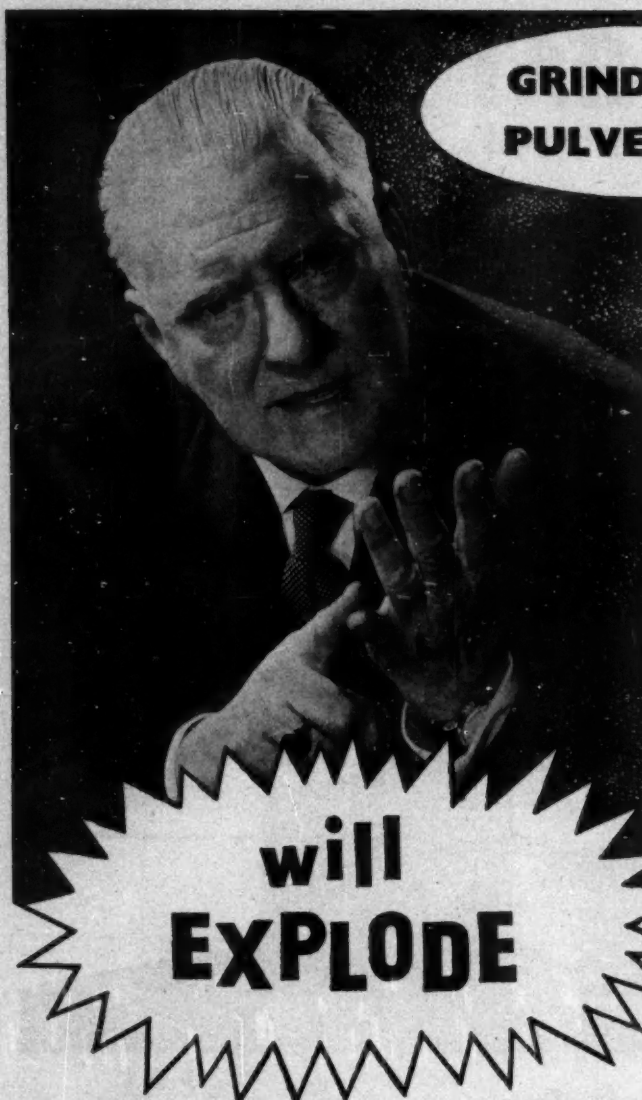
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# CHEMICAL AGE

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## SCIENCE AND PROGRESS

**T**ECHNOLOGY and world advancement—this was the theme of the presidential address given by Professor P. M. S. Blackett at the inaugural meeting of the British Association for the Advancement of Science in Dublin on Wednesday this week. In developing his address Professor Blackett traces the work of the ancients and relates this to our present social and economic organisation.

His opening sentence forcibly draws attention to today's problems. Scientists have often been reproached for not concerning themselves sufficiently with the effects—for good or ill—of their discoveries on society and immediately we think of atom power and bombs, jet planes and rockets.

How right is Professor Blackett when he says 'in science and technology is the key to wealth; and the creation and distribution of wealth are the warp and woof of the many-patterned texture of politics.' He considers, and others will no doubt agree, that many scientists and engineers have in the past deliberately avoided thinking more than they can about the social consequences of their collective achievements—to do so would sweep them into the troubled waters of political controversy.'

It is suggested that this political controversy arises from the development of natural science and technology, because of the backwardness of the social sciences that have been the basis and the reasons for the outstanding developments from the 17th century to the present day in the Western world. Professor Blackett feels there is no agreed answer but believes that most probably it was differences in social and economic organisation which were the decisive factors. Also essential was the scientific revolution resulting from a Europe which became tolerant first to religion, thus assisting its trade and the intellectual tolerance which followed. From struggles against privilege and restriction, Britain came to be the first industrial nation.

As is stated by Professor Blackett, it is recognised that 'most scientific and technological innovations can lead to continually increasing wealth only when they become embodied in material things, particularly production goods such as machine tools, chemical and fertiliser plants, transport and communication systems. Nuclear power, the outstanding technical development of this decade, adds to wealth only when nuclear power stations have been built.'

How fitting it is that a reminder should be given regarding the high capital cost of industrialisation when taxes today in this country are so heavy. For heavy basic industries such as steel, oil refining or heavy chemicals, a capital of £5,000 to £10,000 a man employed is required. High cost of industrialisation is the present dividing line between the US, the UK and Europe, and the pre-industrial countries, particularly those of Asia, Africa and South America. Today, Professor Blackett reports, in addition to maintaining existing wealth the Western world saves and invests in productivity about 10 per cent of its income of £300 a head per year compared with the pre-industrial areas average income of about £20 a year a head, for both consumption and production goods.

Much has been heard in recent years of India's five-year plans, particularly for her chemical industry. During her first five-year period which ended in

1956, her national income rose by 18 per cent. For the next period, a rise of national income of 25 per cent is planned. But recent announcements (see CHEMICAL AGE 13 July p. 52) suggest this is doubtful without external financial aid.

For the outstanding problem of the now widening gap between the highly industrialised countries of the Western world and the pre-industrial Asian countries with the exception of Japan, Professor Blackett put forward, not technical help, but financial aid of an additional £1,000 million a year as a free gift or as long-term loans from the 400 million rich Westerners to the 7,000 million Asians, Africans and South Americans in the underdeveloped countries outside the Soviet orbit.

This amounts to a levy of 1 per cent of Western donors' incomes and a total payment by Britain would amount to £150 million a year. This sum would, he states, only postpone by less than a year the expected rise of 50 per cent in British living standards over the next 25 years. To recipient countries, however, it would mean a 5 per cent addition to their income of £20 a year and wisely invested would allow a 2 per cent a year rise in the standard of life.

These are worthy sentiments but as Professor Blackett himself questions whether the Western should make this sacrifice, so no doubt will the many anxious industrialists in this country and those in our Commonwealth. Canada, for instance, needs financial help (see CHEMICAL AGE 27 July p. 136). Also, before the war years Britain had chemical interests in South America. Today, partly due to South American policies and partly to the lack of UK capital for investment there, having regard to home needs in developing the petrochemical and plastics industries and nuclear power, circumstances prevent any adequate measures of help. Germany and the US, however, either alone or together, are vigorously pursuing their interests in that part of the world. They are helping South America and Japan quickly to develop large industrial units.

In the East, though, the countries are dividing into Soviet and anti-Soviet blocs. 'Where the West does not help, perhaps the Soviet will' Professor Blackett suggests. His choice is for self-sacrifice of some prospects of immediate prosperity to provide aid for the 'have-not' countries. He feels that immediate moral good might result and ultimately, material good as well. The professor then places the responsibility for action on the scientists and technologists as it is 'their genius and their skill which alone can bring the material basis of happiness within the reach of all.'

## CHRONIC BERYLLIUM POISONING

AS an industrial hazard, beryllium was little known until 10 years ago and it is even more recently since protective measures have been taken to safeguard exposed workers. Beryllium compounds are known to give rise to three main syndromes: acute inflammation of the respiratory system; dermatitis and conjunctivitis; and chronic granulomatosis and fibrosis affecting mainly the lungs, but also other organs and often associated with progressive loss of weight.

In the *Lancet* (1957, ii, 267) a case of chronic beryllium poisoning, which has been followed since January 1949, is reported. A young woman had worked for three months in a research laboratory of an industrial company where she was engaged in the production of manganese carbonate but at times she helped to mix and then grind in a mortar zinc oxide, beryllium oxide, manganese compounds and silicates. These dry powders were fired to produce zinc beryllium silicate, which was ground again and packed. It appears that no special precautions were taken to protect the workers.

Chronic beryllium poisoning was diagnosed 18 months after this short exposure to beryllium compounds by dyspnoea, cough, wasting, and nodular lesions of the lungs.

By 1950, her condition was so serious it seemed likely that she would not survive.

In a consideration of this case, the doctor concerned, Dr. W. N. Rogers, remarks that the aetiology of beryllium poisoning presents interesting but as yet unsolved problems. Thus the number of persons affected is very small compared with the numbers at risk; the onset is usually delayed, and the poisoning becomes manifest long after exposure has ceased; severe or lengthy exposure does not appear to be necessary (in this particular case less than three months); individual sensitivity, beryllium and/or its salts, and other contributory agents appear to be involved. Patch tests favour the view that the condition is due to an acquired allergy.

To date only two other cases have been reported in this country. Prognosis is bad, death occurring in 30 per cent of cases, the rest having a chronic course with remissions and exacerbations.

Fortunately, since beryllium poisoning is now recognised as an industrial hazard, few cases are likely to occur. This, however, may lead to the rare case being missed.

## AUSTRALIAN SULPHURIC ACID

AUSTRALIA'S present capacity to produce sulphuric acid is of the order of 1,060,000 tons a year, and 95 per cent of this capacity is currently used. Less than half of this sulphuric acid production is from indigenous materials, the remainder being obtained from brimstone, imported mainly from the US.

At present 80 per cent of Australian sulphuric acid manufacture is used in the production of superphosphate, some 5 per cent to produce ammonium sulphate and the balance of 15 per cent is used in a great number of industrial applications. Demand for the acid will undoubtedly increase with the more extensive use of superphosphate in pasture lands.

Sulphuric acid production for the year ended June 1956 totalled 904,500 tons, of which almost 360,000 tons were made from Australian materials, about 40 per cent of the total. An improvement is expected in the current year, for which the estimated total production is 977,600 tons, including 474,000 tons from Australian materials. It is expected that the percentage used should rise to 50 per cent, although even this is below the target set by the Australian Government as the desired level of usage.

Recently the Sulphuric Acid Bounty Bill 1957 was given its second reading and the Hon. Mr. F. M. Osborne, speaking on this Bill, said that at the present time bounty is restricted to sulphuric acid produced from Australian pyrites and sold for delivery in Australia or used by the producer in the manufacture of fertilisers. The first amendment of the Bill extends the field of bounty to cover all sulphuric acid produced from prescribed materials irrespective of the use to which the acid may be put in Australia.

The second amendment removes the A£600,000 limitation in the amount that can be paid, as bounty, on each year's production. It is hoped that this will overcome the sulphuric acid industry's fears that increased usage of pyrites would reduce the rate of bounty payments. Bounty payments on sulphuric acid production at the end of the first year of the Act (June 1955) were A£472,557. For 1956, payment was A£446,666, while payment on production during the half-year completed to December 1956 amounted to A£221,222. The Australian raw material prescribed as subject to bounty is pyrites. However, since the Broken Hill Association Smelters Pty. Ltd., began production of sulphuric acid at Port Pirie in South Australia from the gases arising from the roasting of lead concentrates produced at Broken Hill, the Australian Tariff Board has been asked to consider whether such sinter gases should be brought into the bounty field as well. Such a move would materially assist production of sulphuric acid from such sources and, indeed, should encourage other potential manufacturers of sulphuric acid.



# BA ANNUAL MEETING OPENS IN DUBLIN

## Chemical Aspects of Lung Cancer Discussed

MEMBERS of the British Association for the Advancement of Science were welcomed at the Association's annual meeting, which this year is being held in public from 4 September to 11 September, by the Rt. Hon. the Lord Mayor of Dublin, Dr. Michael Tierney, the President of University College, Dublin, and Dr. Albert J. McConnell, the Provost of Trinity College, Dublin on Wednesday evening, 4 September. The President of the British Association, Professor P. M. S. Blackett, F.R.S., Nobel Laureate, then delivered his address on *'Technology and world advancement'*. (See p. 355.)

Earlier in the afternoon of Wednesday a reception was held for young chemists of the Chemistry Section by Professor W. Cocker and Professor T. S. Wheeler in the Chemistry department of University College, Dublin.

On Thursday morning the president of the chemistry section, Dr. J. W. Cook, F.R.S., opened the exhibitions in University College. These comprised an exhibition of glass models showing atomic orbitals, molecular orbitals, elements of symmetry and stereochemistry of cyclohexane, decalins and steroids, and an exhibition of the history of chemistry in Ireland. Later, at the Dixon Hall, Trinity College, Dr. Cook delivered his presidential address on *'Chemical approaches to the investigation of lung cancer.'*

### Chemistry Section Address

In giving this address, Dr. Cook proposed to survey a field in which precise scientific knowledge was largely lacking and the implications of what knowledge there was, rather conjectured. He said Professor Cleme had, in his presidential address in 1953, made reference to the increase in lung cancer, focusing attention on smoke in the air, and to work on polycyclic hydrocarbons collected in air-filters. Now, epidemiological studies had provided a weighty body of evidence which seemed to incriminate tobacco smoking, particularly in the form of cigarettes.

Statistical evidence and the reports by doctors Bradford Hill and Doll in Great Britain and Wynder, and Hammond and Horn in the US, were considered by Dr. Cook. He felt that most experimental scientists would find the conclusion of statistical studies more convincing if they could be backed by supporting experimental studies into the nature of tobacco smoke.

Discussing experimental investigation of tobacco smoke, Dr. Cook referred to the presence of the known carcinogen 3:4-benzpyrene, in tobacco smoke which could be isolated from the tars formed

from condensed smoke. Certain workers (Lindsey and co-workers) had estimated that 1 microgramme of 3:4-benzpyrene was present in the smoke from 100 cigarettes, although others had reported more than 10 times this quantity. Dr. Cook suggested that whether benzpyrene would be carcinogenic in such low concentration was problematical.

Cigarette paper was also considered by Dr. Cook. One estimate had suggested that cigarette paper accounted for about a third of the benzpyrene formed by smoking a cigarette. A question which merited more detailed consideration was whether the presumed carcinogenicity of cigarette smoke was related to its acidity.

Discussing the composition of tobacco smoke, Dr. Cook remarked on the range of substances which smoke contained and that survived without charge or relatively little change. It had been suggested that the n-hentriacontane present in tobacco gave rise to much of the polycyclic aromatic hydrocarbons, including 3:4-benzpyrene. The cracking of hentriacontane produced a mixture of polycyclic aromatic hydrocarbons similar to those in smoke, and this had led to the suggestion of removal of paraffins of this type from tobacco by washing with solvents.

Alkaloids of tobacco smoke also tended to be highly aromatic compounds derived from the tobacco alkaloids and formed from them by pyrolytic degradation. As these had been very incompletely investigated, Dr. Cook considered these also merited further investigation.

To the carcinogen 3:4-benzpyrene had now been added 3:4:9:10-dibenzpyrene which had been shown to be present in tobacco smoke by continued chromatographic and spectroscopic techniques. If confirmed, this finding would incriminate the neutral fraction of tobacco tar.

Pipe smoking gave higher yields of polycyclic aromatic hydrocarbons than cigarette smoking. One worker, Dr. Cook reported, had found that tar from tobacco smoked in pipes produced twice as many skin tumours in mice as condensate from cigarette smoke. These findings might be related to the fact that the temperature of burning tobacco in pipes (450°-500°C) was about 200-250°C below that of cigarettes. These findings, however, did not readily accommodate the higher incidence of lung cancer in cigarette smokers compared with pipe smokers, and, stated Dr. Cook, it seemed clear that the formation of complex carcinogenic hydrocarbons was not the whole story.

Inorganic compounds in tobacco smoke, although present in very small amounts, should not be overlooked, while radioactivity of one cigarette was approximately that of 25mg. of potassium. Radioactivity of smoke was about that of 6 microgrammes of potassium. More serious was

the arsenic content of cigarette smoke and there was evidence that arsenic might be responsible for certain occupational skin cancers in man.

Atmospheric pollution had been the subject of extensive surveys, said Dr. Cook. Again 3:4-benzpyrene (from coal-tar) appeared to be incriminated, although there was evidence that coal-tar contained other carcinogens. The other main sources of atmospheric contamination suspected as causes of lung cancer were exhaust fumes from internal-combustion engines and diesel engines. A number of polycyclic aromatic hydrocarbons, including 3:4-benzpyrene, had been detected in these fumes. Benzpyrene formed at the rate of nearly 1mg per minute during acceleration from low speed.

Artificially produced smog prepared by treatment of petrol vapours with ozone, and said to resemble authentic smog closely, was being studied. It had been shown that mice exposed to this smog had a greater incidence of lung tumours (adenomas) than controls.

Dr. Cook mentioned that dust from tarred roads had also been suspected of being implicated in the increased incidence of lung cancer, and carcinogenic substances might also be present in the carbon black incorporated into tyres.

### Industrial Cancers

Lastly Dr. Cook spoke of the enhanced liability to lung cancer to which workers in certain industries were exposed. He referred to lung cancer in Scheenbergh (Saxony) and Joachimsthal (Bohemia) miners, which was almost certainly due to ionising radiations from radioactive gases and/or dust. He expressed the hope that due regard was being paid to this hazard in the much more extensive uranium and thorium mining now being undertaken and in the handling of these materials. It was also possible that atmospheric radioactivity arising from the natural decay of radioactive minerals was responsible for some of the lung cancer which now occurred.

Evidence of other examples of occupational lung cancer was building up. In some cases metals or other salts were responsible. Excessive cases of lung cancer had been reported among nickel workers in the chromate industries and also gas-retort workers, said Dr. Cook. An increase in lung cancer had been noted in haematite miners in Cumberland. Beryllium gave rise to curious histological changes in the lungs, although these had not been proved to be pre-cancerous. Rats, however, that inhaled dust of beryllium salts for a year developed tumours. Other industrial materials which had been implicated in occupational lung cancers were asbestos and arsenical dust.

In conclusion Dr. Cook said that the whole question of lung cancer was very complex and unlikely to admit of any simple solution. The balance of evidence was strongly in favour of the view that carcinogenic agents were primarily concerned. He was convinced, he said, that the chemist had to play an increasing part in the study of the various factors involved.





★ 'Without the development of the chemical industry we certainly could not have the high standard of living which we now enjoy to-day'. Few in the industry will argue with that statement made by Dr. David Traill, research director of ICI Nobel division, when last week he presented 50 research department students, who attained first-class passes in their examinations, with awards totalling £430.

He added that the achievements of the UK chemical industry were impressive by any standards. Its growth had been very nearly double that of all manufacturing industry over a long period. This high rate of expansion and the general speed of technological change in the industry had raised the standards of the profession.

It also means that students' work is becoming more difficult, there being more to learn and more to achieve. Dr. Traill declared: 'The chemical industry presents a challenge to every kind of scientist who is prepared to match his ability against the ever-changing circumstances of to-day.'

★ A BOARD OF TRADE survey shows that after an increase of 14 per cent in 1955, UK exports of chemicals rose by only 5 per cent in 1956, half the rate of increase of world exports. Fertiliser exports fell from £4.6 million in 1955 to £1.1 million. Dyestuffs exports also fell slightly in 1956 and there was no increase in exports of drugs and medicines.

Among the United Kingdom's competitors the US, up 13.9 per cent, West Germany, up 14.8 per cent, Japan, up 13.8 per cent, other OEEC countries, up 8.8 per cent, and other main countries, up 10.8 per cent, registered the greatest increases in the chemicals field. More recently there has been evidence of a renewed expansion of UK exports; in the first seven months of 1957 they were 12 per cent above their level in the corresponding period of 1956. Big increases in chemical exports were made to three of our largest competing countries, West Germany, Japan and France; as well as to India and Australia. UK exports of drugs and chemicals in the period January to July were up by £2.6 million over the first seven months of last year (see p. 374).

Sales of UK chemicals to France, £1½ million up on last year, will doubtless suffer a reverse in coming months because of French currency adjustment and import restrictions, which will help French chemical firms widen their foreign markets.

★ ALEMbic learns that the outlook across the Atlantic for adipic acid is excellent. Capacity this year will expand by 23 per cent to a total of 350 million lb. Next year, production is expected to rise by some 30 per cent. The Baird Chemical

Corporation of New York report that the reason is the big growth in demand for nylon in tyre cord manufacture.

Nylon is responsible for about 85 per cent of adipic output, plasticisers about 10 per cent and urethane foams about 3 per cent. Although adipate plasticiser production declined 20 per cent in the past two years, an upturn is expected. The current 9 million lb. output of adipates will increase to 13 million lb. by 1960. Didecyl, di-(2-ethylhexyl), and di-iso-octyl adipates are now moving in the US in quantities of over 1 million lb. a year.

As yet, Alembic understands, there is no nylon cord plant in this country because high tenacity rayon holds the market. A German associate of Hoechst is, however, believed to be laying down a nylon cord plant, not because of any present large demand but because it is felt the US trend will be followed in Europe eventually. At least one prominent executive in this country holds the view that before nylon cord can be developed in the UK, the rubber tyre might be replaced by an injection moulded product.

★ AFTER three years of field trials, Shell Chemical Co. have introduced their seed dressing Dieldrex C as a recommended control for wheat bulb fly. This is a timely introduction for only recently a meeting was arranged to discuss the best form of advice to be given to farmers on the chemical control of this fly. The meeting was attended by representatives of Rothamsted Experimental Station and the Association of British Insecticide Manufacturers.

They recommend using a seed dressing containing at least 40 per cent aldrin, or 40 per cent dieldrin, or 40 per cent gamma BHC (with the usual organo-mercurial) at 2 oz. per bushel. It was stated that there was some risk of phytotoxicity with gamma BHC. Dieldrex C contains 60 per cent dieldrin together with mercury. When applied at a rate of 2 oz. per bushel, the dressing is said to provide protection not only against wheat bulb fly but also to control wireworm and seed borne diseases of wheat.

Alembic understands that it is particularly suitable for use against wheat bulb fly because of its freedom from phytotoxic effects and low cost.

★ It is now well known that ethylene amine hardeners for epoxide resins are skin irritants and may cause dermatitis. Some workers consider that certain types of epoxide resin also give rise to dermatitis, but Bakelite Ltd. tell Alembic that from their experience no cases of this skin condition have been reported which can be traced to contact with their resins. The company adds, however, that it is probable that there will be some few individuals who are

peculiarly sensitive to the resins and develop some skin reaction.

The ethylene amines used as hardeners for epoxide resins are mainly ethylenediamine, diethylenetriamine, triethylenetetramine and tetraethylenepentamine. These materials are highly alkaline and are capable of acting as skin irritants and skin sensitizers. Diethylenetriamine is included in the Bakelite range of hardeners for epoxide resins, but also available are modified ethylene amines of reduced toxicity.

As a further step to the reduction of dermatitis, due to the handling of epoxide resin systems, the company has introduced a number of modified amine hardeners of reduced irritation potential as well as a minimum irritation potential hardener that has been extensively tested in the US and found to be substantially non-irritant.

★ Few products are introduced to industry by being trampled underfoot by their salesmen. Alembic learns, however, that this is precisely the treatment which representatives of Joseph Crosfield and Sons, Ltd., Warrington, are now giving to Microcal, their new calcium silicate.

One of the major uses of this product is in the manufacture of resin rubber solings—an outlet which appealed so much to the Crosfield representatives that the company agreed to their demand for new shoes with Microcal-filled resin rubber solings. With effect from 2 September, Crosfield, the largest UK manufacturers of sodium and potassium silicates, started marketing this new product for use in rubber, synthetic rubber and paper.

The ultra-fine ultimate particles of the synthetic calcium silicate have a size of 30  $\mu$  when viewed under the electron microscope. The comparatively low degree of agglomeration of the ultimate particles in the powder ensures ready dispersion during rubber compounding operations. This ease of dispersion, combined with an absence of dustiness, make Microcal particularly suitable for use as a reinforcing filler for shoe soling compounds containing styrene-butadiene resins.

★ THE DU PONT polyester family has had triplets. So runs the headline in the magazine of E.I. Du Pont de Nemours. The latest addition is Cronar polyester photographic film.

The company first began investigating the polyesters in 1928. This work was given up in 1933 when the basic research team started to concentrate on another more promising group, the polyamides. Meanwhile, work on the polyesters had become part of the literature and was followed up by ICI chemists who commercially developed the polyester fibre, Terylene.

Du Pont later purchased the US patent for Terylene and subsequently produced Dacron polyester fibre. The third member of their polyester family made its commercial debut earlier this year. To translate their early research work into these three products has cost Du Pont more than \$115 million.

*Alembic*

# British Pharmaceutical Conference

## Papers read at the 94th Meeting held in Bristol

**P**HARMACISTS have this week attended the first conference to be held at Bristol since the beginning of this century. The conference last met there in 1903.

The opening address was given on Monday, 2 September, by the chairman of the conference, Dr. Frank Hartley, scientific services director of British Drug Houses Ltd. Dr. Hartley's address was on 'Steroids in pharmacy and medicine'. In this he dealt with the steroids and cholesterol, bile acids, antirachitic vitamins, steroid hormones, and anabolic agents. The role of oestrogens, progestational substances and androgens and recent developments in these, the adrenocortical hormones, with particular reference to aldosterone and the glucocorticoids were all considered. Touching upon recent developments in the steroid field Dr. Hartley made special reference to steroids as anaesthetics and to the androgens as anabolic agents. The need for steroids 'tailored' to a particular therapeutic requirement was alluded to and mention was made of the systematic examination of various alkyl-, halogeno-, nor- and dehydro-steroids in Europe and the US.

The science sessions of the Conference began on Monday afternoon and continued throughout the week. Extracts of some of the papers are given below.

### Purity of Chloroform

The formation of strychnine chloromethobromide when strychnine is dissolved in chloroform led to an investigation of the purity of this solvent. A. C. Cames and G. E. Foster (Wellcome Chemical Works) presented this work in their paper *The purity of chloroform BP*.

The presence of both methylene dichloride and chlorobromomethane in a sample of chloroform BP was shown by gas chromatograms. These impurities were found to be much reduced, however, in chloroform, which had been recovered from a solution of strychnine in chloroform previously boiled for some hours.

The authors accept that the bromine present as chlorobromomethane arises from the chlorine, used directly or indirectly, in the manufacture of the chloroform. They stress that very little analytical information is available regarding the purity of commercial chlorine and, as far as they are aware, there is no international specification available for the product. Mellor's 'Comprehensive Treatise on Inorganic and Theoretical Chemistry', Supplement II, Part I, London 1956, lists as impurities hexachlorethane, carbon tetrachloride, chloroform, bromine and ferric chloride to a total of 0.2 per cent. Carbon dioxide, hydrogen chloride, oxygen, carbon monoxide, nitrogen and hydrogen have also been reported as impurities.

Chlorinated hydrocarbons may occur from reaction between chlorine gas and

lubricants used on valves, etc., and these together with some other impurities may be removed by liquefaction and subsequent distillation of chlorine. This procedure, however, cannot be relied on to remove bromine.

Reference is made to the methods of preparation of chloroform. Most chloroform, it is believed, is manufactured in the UK by the acetone-bleaching powder process, although chlorination of methane may also be used. With regard to the acetone-bleaching powder method, Caws and Foster consider brominated products would result, although the course of the reaction is unknown. In the chlorination of methane, methylene chloride, methylene dichloride, chloroform and carbon tetrachloride form. These are then separated by fractionation, and the chloroform so produced may contain traces of methylene dichloride.

It is suggested that most impurities could be removed by distillation during the final stages of the manufacture of chloroform, but that chlorobromomethane, with a boiling point similar to chloroform, would be difficult to eliminate. No accurate quantitative work has been carried out but up to 0.5 per cent of chlorobromomethane may be present in chloroform BP.

It is pointed out that the presence of methylene dichloride and chlorobromomethane in chloroform will give rise to error in alkaloidal assays.

### Examining Essential Oils by Spectrophotometry

Various methods have been used in the past to determine the cineole contents of lavender oil. A. H. J. Cross, A. H. Gunn and S. G. E. S. Stevens (Smith Kline and French Laboratories Ltd., London) described the *Application of infra-red spectrophotometry to the examination of essential oils (part I, cineole in lavender oil)*.

The unsatisfactory determination of cineole content as 'apparent cineole' content by *o*-cresol when applied to lavender oils is shown and it is suggested that it is the higher boiling fractions (i.e. esters and alcohols) that are mainly responsible for the errors arising from the use of this method.

Fraction 6 and the undistilled residue of English oil fractionated by Cross *et al.* which together represented some 57 per cent of the original oil, contained little or no cineole when examined by the infra-red method and yet appeared to contain substantial amounts of cineole when tested with *o*-cresol.

Using a Hilger H.800 double beam infra-red recording spectrophotometer fitted with sodium chloride optics, it has been shown that lavender oils in capillary films, in the range 5,000  $\text{cm}^{-1}$  to 650  $\text{cm}^{-1}$  show peaks at 1,310, 1,220, 1,085 and 855  $\text{cm}^{-1}$  of diagnostic value for cineole.

After some preliminary work, a standard concentration of 2.5 per cent w/v of dried oil in carbon disulphide was used for quantitative estimations of cineole. In the experiments the sample cell had a path length of 0.500 mm., whereas the reference cell containing only carbon disulphide was adjusted to a path length of 0.485 mm. Solutions were examined over the frequency range 1,125  $\text{cm}^{-1}$  to 1,040  $\text{cm}^{-1}$  at a scanning speed of 18  $\text{cm}^{-1}$  per minute a slit setting equivalent to a band width of about 2  $\text{cm}^{-1}$  and a recorder chart speed of 0.5 inches per minute. Four tracings were run for each solution and the average used in computing the cineole content by an 'absorbing difference' method. This method is claimed to provide a truer assessment of the cineole content of lavender oils than do the methods currently described.

French oils were found to contain little or no cineole, English oils contain up to 13 per cent and the spike-lavender oils from 22 to 31 per cent of cineole. It is stated that before any general classification on a basis of the cineole content of the official lavender oils can be attempted it will be necessary to examine a larger range of genuine oils.

### Mixed Solutions of Phosphatides

The preparations of pure crystalline lecithin and lysolecithin were described by L. Saunders, Physical Chemistry Dept., School of Pharmacy, London, in his paper *Some properties of mixed solutions of lecithin and lysolecithin*. Mixed sols of these phosphatides were prepared and their viscosities, stabilities to salts and haemolytic activities have been examined. Pure lecithin sols although turbid in appearance were stable for long periods. Introduction of lysolecithin was found to reduce the turbidity and at a weight fraction lysolecithin to total phosphatide of 0.35, the sols became optically clear.

Pure lecithin and lysolecithin sols both had viscosities similar to that of water. Introduction of lysolecithin into the lecithin sol caused a big rise in viscosity and at the maximum the sols were very thick liquids.

This pronounced interaction between lecithin and lysolecithin in aqueous sols has not previously been reported. At a lysolecithin weight fraction of 0.35 to 0.4, important changes in the properties of the sols occur; below this range, the sols are precipitated by salts. Any required degree of stability to salt solutions can be obtained, Saunders states, by adjusting the proportion of the lyso compound in the sol.

### Salicylic Acid Derivatives as Anti-Fungal Agents

A series of 2-alkoxy derivatives of benzamide, halogenated benzamides, 3-naphthamide, and N-substituted benzamides have been prepared and tested *in vitro* as potential antifungal agents.

The results were described in the paper *Preparation and antifungal activity of some salicylic acid derivatives*, by L. V. Coates,



D. J. Drain, K. A. Kerridge, F. June Macrae and K. Tattersall (Smith and Nephew Research Ltd., Ware, Herts.)

They show that the most active of the derivatives studied was 2-n-amyloxybenzamide, a slow-acting fungicide of greater fungistatic potency than undecylenic acid, N-n-butyl-3-phenyl salicylamide, salicylanilide, Nystatin, phenylmercuric acetate, sodium ethylmercurithiosalicylate and 8-hydroxyquinoline.

### Rheology of Oil-in-Water Emulsions

Previously, Arnold Axon, author of the paper on *The rheology of oil-in-water emulsions. Part II. The microscopical appearance of emulsions in laminar flow*, showed that semi-solid emulsions have anomalous viscous behaviours, which can be distinguished in a complete consistency curve determined on a rotational viscometer. Subsequently it was suggested that the change from shear-rate thinning to uniform plastic flow, occurring when an emulsion containing bentonite was autoclaved, depended on the state of dispersion of the globules.

This present paper records the differences in microscopical appearance of semi-solid oil-in-water emulsions prepared from liquid paraffin, sodium lauryl sulphate, cetyl alcohol with and without bentonite.

The use of an ultramicroscope for the detection of particles in smoke suggested a possible method for examining flowing emulsions. The apparatus devised by Axon consisted of a microscope cell which fits on the stage. A hypodermic syringe is attached to the Perspex disc of the cell and provides a reservoir for the emulsion and a convenient means for propelling it. The cell unit consists of four parts: a pressure plate, a microscope cover glass, and a tunnelled Perspex disc clamped together in a suitable metal fitment.

It was found that unautoclaved and autoclaved emulsions from cetyl alcohol, sodium lauryl sulphate, liquid paraffin with and without bentonite showed differences in the dispersion of the globules. Those in the unautoclaved emulsions were mainly associated, 'flocculated', into loose clusters in which each globule was free to move independently of its neighbours. Composite masses of disperse phase, called agglomerates, were formed in emulsions prepared from a preformed 'emulsifying wax' which were absent from emulsions formed by adding sodium lauryl sulphate to the aqueous phase.

A compact type of floccule occurred in the autoclaved emulsions containing bentonite. The globules were surrounded by a hydrated layer of bentonite which restricted their movement and provided a mechanical barrier against deformation. Rigidity was supplied by association of the hydrated bentonite particles in a network to form a gel. The globules in the autoclaved emulsions without bentonite were readily deformed and showed complete freedom of movement with no association into clusters.

### Determining Morphine in Opium

As the Svendsen and Aarnes method (*Sci. Pharm.*, 1955, 23 (1), 18) for the determination of morphine in opium appeared to

be relatively simple to operate, it was deemed worth further investigation in an attempt to obtain a suitable assay for opium and some of its galenical preparations. *Determination of morphine in opium and some of its galenical preparations*, by D. C. Garratt, C. A. Johnson, and Cecilia J. Lloyd (Analytical development group, Standards Department, Boots Pure Drug Co. Ltd.).

Morphine is first separated from other alkaloids and extraneous matter by elution from an alumina column with an organic solvent and subsequent extraction with alkali. The morphine is then precipitated as the dinitrophenylether with 1-fluoro-2,4-dinitrobenzene.

Satisfactory results on both Turkish and Indian opiums were obtained and the method was extended to the determination of morphine in galenical preparations.

In cases where the pharmacopoeial method based on the colorimetric nitroso reactions may give high results, figures in accordance with the expected values have been obtained with Svendsen and Aarnes' method.

An appendix is attached to Garratt *et al.*'s paper on 1-fluoro-2,4-dinitrobenzene.

## Spectrophotometric Determination of Aldehydes and Ketones

Development of a rapid method was outlined in *Spectrophotometric determination of a  $\beta$ -unsaturated aldehydes and ketones with Girard-T reagent, Part I. Essential oils*, by J. B. Stenlake and W. D. Williams (School of Pharmacy, Royal College of Science and Technology, Glasgow).

By using Girard-T reagent, the derivatives of which are water-soluble and readily separated from non-carbonyl constituents of the oil, interference due to irrelevant absorption can be overcome.

Like the semicarbazones Girard-T hydrazones of  $\alpha\beta$ -unsaturated carbonyl compounds show considerably greater absorption than the present substance, it is stated. However, Stenlake and Williams remark that this, together with the longer wave length of the maxima, not only tends to reduce errors caused by irrelevant absorption, but also increases the sensitivity of the method by a factor of about 2.5.

Pure cinnamaldehyde was used as standard, for when treated by the given method, it gave an E (1 per cent, 1 cm.) value, equivalent to that obtained with the crystalline Girard-T hydrazone. As a result, pure citral and pure carvone are said to provide satisfactory standards, although the corresponding crystalline Girard-T derivatives from citral and carvone could not be isolated.

The results obtained using the spectrophotometric method showed that it was specific for  $\alpha\beta$ -unsaturated compounds so that citronellal and methylheptenone in lemon oils would not need to be estimated. The differences with this method and the hydroxylamine hydrochloride method for determining total aldehydes or ketones in volatile oils were found to be so large that the standard and the commercial citral were re-examined by both methods. Satisfactory agreement was obtained so that

As two commercial sources provided two different types of material, the product has been prepared using the synthesis described by Finger and Finnerty (*Biochemical Preparations*, Vol. III, 1953). A mixture of 900 ml. of concentrated sulphuric acid and 300 ml. of concentrated nitric acid is heated to 50° to 60°C. and 192 g. of fluorobenzene is added with constant stirring at such a rate as to maintain the temperature between 70° and 75°C. When the addition is complete the reaction mixture is maintained at 85°C for 30 minutes, then cooled and poured into 4 litres of ice cold water. This is left over night and on the following day the oil is distilled under reduced pressure.

A yield of 250 grammes was obtained, having a boiling point of 166°C. at 11 mm. pressure, weight/ml. at 20°C., 1.5429, and refractive index at 20°C. of 1.5682.

It should be noted that 1-fluoro-2,4-dinitrobenzene is a vesicant and therefore care should be taken to avoid contact with the eyes.

Various samples gave essentially identical infra-red spectra. Quantitative recoveries of morphine were obtained with these samples. Therefore, it appears that the solid and liquid forms are polymorphic forms of 1-fluoro-2,4-dinitrobenzene.

differences in the figures for lemon oils themselves by the two methods can only be attributed to the presence of other carbonyl compounds.

Deterioration of the standard can give somewhat lower figures for citral on re-examination. Cinnamon oils may contain o-methoxy-cinnamaldehyde, which can be calculated as cinnamaldehyde by the spectrophotometric method. Cinnamon oil proved to be difficult to assay chemically because of the small cinnamaldehyde content, but no difficulty was experienced using Girard-T reagent.

Samples of caraway and dill oils were of interest. Both were discoloured and of considerable age. By the official method, a satisfactory carvone content was obtained but the endpoint was doubtful. The spectrophotometric method on the caraway oil gave results which did not comply with the British Pharmacopoeia requirements. The physical constants of oil were determined therefore. These were satisfactory except for the optical rotation (+64°) which is outside the official limits. This, therefore, affords a measure of support for the spectrophotometric result. The results so far obtained indicate the utility of Girard-T reagent, particularly where only small quantities of aldehyde occur, as in cinnamon leaf oils. The method, according to these workers, provides a closer approximation to the true citral content of lemon oils. This may not necessarily be a guide to the organoleptic properties of these oils.

### Part II: Ketosteroids

The rapid spectrophotometric method has also been applied to the determination of  $\alpha\beta$ -ketosteroids, in particular, ethisterone and methyltestosterone in tablets. Hot glacial acetic acid readily extracts the



ketosteroids from tablet bases to give a solution suitable for treatment with Girard-T reagent. Reaction was complete within three minutes at 100° with both the above-mentioned steroids and this was adopted as the standard reaction time. Preliminary observations showed that sucrose and glucose interfered markedly when present as solids in the reaction mixture. This interference was reduced when solutions saturated at room temperatures with respect to the sugars were used.

Results obtained on ethisterone and methyltestosterone tablets using the Girard-T spectroscopic assay, showed that the speed of the method represents a considerable advance on the USP XV method for ethisterone, for which the extraction procedures alone take 8 hours.

Directions given are as follows: To determine the ketosteroid in tablets the average weight of a sample of 20 tablets

is ascertained. The tablets are powdered and an accurately weighed quantity, equivalent to about 1 mg. of ketosteroid, is transferred to a dry test-tube. To this 1 ml. of freshly prepared 2 per cent w/v solution of Girard-T reagent in glacial acetic acid is added. The tube is plugged loosely with cotton wool and heated with gentle swirling in a boiling water bath for three minutes. After cooling the contents are diluted with water, transferred to a 200-ml. flask containing 100 ml. water and sufficient N. sodium hydroxide to neutralise 9/10 of the acetic acid. The tube washings are also added and the whole is made up to the mark.

Optical density of the solution is measured in 1-cm. cells at the appropriate wavelength of maximum absorption using water as reference solution. Constant E (1 per cent, 1 cm.) is calculated from the difference between the optical densities.

## Effects of Increasing Stillhead Surface Area During Distillation

Effect on the amount of entrainment passing during distillation when the wall surface area of straight vertical stillheads is increased, has been investigated. Some effects of increasing stillhead surface area on liquid entrainment during distillation, by David Train and Bayardo Velasquez-Guerrero (School of Pharmacy, London).

Using essentially the same apparatus and techniques of Shotton and Habeeb (*J. Pharm. Pharmacol.*, 1954, 6, 1023, *ibid.*, 1955, 7, 456) the increase in wall surface area was achieved by introducing into the stillhead a thin diametrical septum of phosphor-bronze, dull chromium plated to give it melting characteristics similar to those of glass. The quantity of liquid entrained was assessed by estimating fluorimetrically the amount of fluorescein passing from the boiler to the separator and the condenser.

The results of some 450 individual fluorescein estimations indicate that the average increment was 500 ml. The study has demonstrated that reduction in a radial path by introducing a septum, whilst leaving the total cross-sectional area unchanged, reduces the amount of entrainment passing through the stillhead.

Careful observation of the conditions obtaining in the stillhead at the onset of 'gross carry over' showed that the frictional drag force of the rising vapour was sufficient to maintain a thin film of liquid on the walls of the stillhead in spite of the gravitational force tending to draw it downwards. As the distillation rate increased the wall film became thicker and finally, at extremely high rates, the film was dragged as a whole in an upward direction; it even coalesced across the head to form slugs of liquid which continued to be driven upwards by the rapidly ascending vapour. This final condition is similar to that found in the movement of two phases in wetted wall columns in the condition known as 'flooding'.

Insertion of a septum was found to delay the onset of 'gross carry over' since with the increased surface area in the stillhead, there is a greater area of liquid film to be supported. This requires a

greater drag force than can be achieved under experimental conditions by increasing the rate of distillation. When there is sufficient liquid being held so that coalescence into liquid slugs is facilitated, the short radial path produced by the presence of the septum is stated to be advantageous and so flooding occurs at a lower distillation rate than it would have done in the same stillhead without the septum.

## De La Rue Plan £1m. Extension Scheme

AT THEIR factory at Tynemouth, Thomas De La Rue and Co. (plastic division) are to spend £1 million on an extension scheme which will be carried out during the next four or five years. The first stage of the extension is expected to be begun before the end of the year and will be constructed on a recently acquired 20-acre site next to the existing factory. Planning approval has been obtained for 200,000 square feet of extra factory space, increased boiler house accommodation, new stores and offices.

For some time the company—manufacturers of Formica plastic laminate—has been working in a factory designed for only half the present rate of production. Some 1,400 people are employed.

## FOR YOUR DIARY

### THURSDAY 12 SEPTEMBER

SAC (Midland Section)—Birmingham: Mason Theatre, The University, Edmund Street, Birmingham 3, 6.30 p.m. A discussion on 'The determination of some inorganic substances in trade effluents' to be opened by N. T. Wilkinson.

## Dalton Lecture on Coal and Coal Chemicals

THE TENTH Dalton lecture entitled 'Coal and coal chemicals in the national economy', organised by the Manchester and district section, Royal Institute of Chemistry, will be given by Dr. J. Bronowski, M.A., director of the NCB Coal Research Establishment, on 25 October at 7 p.m. in Manchester Town Hall. Professor R. G. W. Norrish will preside and the Lord Mayor of Manchester will be the chief guest. Tickets are obtainable from Dr. R. E. Fairbairn, ICI dyestuffs division, Hexagon House, Blackley, Manchester 9.

The Dalton exhibition on 'Coal and coal chemicals in the national economy' will be held in the Exhibition Hall of Manchester Central Library from 21 October to 26 October. Opening hours are weekdays from 9 a.m. to 8 p.m., Saturday 9 a.m. to 5 p.m. Admission is free.

## Irradiated Polythene in Limited Supply

LIMITED production has now begun of Merad, an irradiated polythene for use in higher than normal temperature conditions. It was first introduced by Mersey Cable Works Ltd., a member of the Tube Investments group, at the recent electrical engineers (ASEE) exhibition.

The manufacture of Merad follows a long period of research at the TI group's Hinxton Hall laboratories into the effects of high energy radiation on the physical and electrical properties of polythene dielectric. Raw materials for the experiments were formulations of normal polythene with chemical modifying agents, which were exposed to high velocity electron bombardment by a van de Graaff 2 Mev particle accelerator.

As a result of this treatment the dielectric properties were unimpaired but the maximum operating temperature had risen from 85° to 100°C. with a short-term operating temperature in the region of 150°C. In addition, the new material does not melt when exposed to higher temperatures but is converted to a rubber-like substance which retains some useful strength up to a temperature of 450°C.

The irradiated product is free from stress cracking in the presence of detergents. Resistance to the action of aromatic and aliphatic hydrocarbons is improved. Tensile strength, elongation and abrasion resistance are improved, while handling and flexibility are virtually unchanged.

## Italian Chemical Industry

Figures in Tables 1 and 4 represent thousands of tons. Figures in Table 5 represent thousands of quintals (a quintal equals 100 lb.). Italian production of hydrogen peroxide (100 vol.) last year was 6,000 tons, and not 60,000 as stated in the text. (See CHEMICAL AGE, 31 August p. 319.)

## New Research Laboratory

Powderloys, Ltd., metallic powder manufacturers, Torrington Avenue, Coventry, are planning to erect a research laboratory at Torrington Avenue.

# Methane's Increasing Importance in European Chemical Industry

## Roumania's Expansion Plans

THAT natural gas will be increasingly used by the European chemical industry, particularly as the expansion of the petrochemical sector is providing a sizeable outlet, is one of the conclusions reached in a 'Report on the position of natural gas in the European economy'. Prepared by the Economic Commission for Europe, the report (1957. II. E/Mim. 6) is available from the Sales Section, United Nations European Office, Palais des Nations, Geneva, Switzerland, 3s.

In annex 1 to the report, information on the usage of natural gas by the chemical industry is given for a number of countries.

**Italy.** Natural gas has become of great importance to the Italian chemical industry partly on account of the simple molecular structure of methane, which makes it well suited to the production of ammonia, methanol, chlorine derivatives (e.g. carbon tetrachloride) and acetylene. Natural gas is sold on specially favourable terms for use in synthetic processes, which induces the chemical industry to make the requisite large investments.

### Seven Plants

At present seven plants are selling increasing quantities of natural gas. In 1955, 267.3 million cubic metres were used as raw material, compared with only 18.4 million cubic metres in 1952.

Between 1952 and 1955, production of synthetic ammonia rose from 237,000 tons to 424,000 tons and natural gas was by far the main factor in the expansion of production shown in the table below.

The result was an increase in nitrogenous fertilisers, the main outlet for ammonia. Domestic consumption rose from 10 to 14 kg. per hectare of cultivatable land, partly owing to appreciable price reductions. Methanol production rose from 13,561 tons in 1952 to 31,626 tons in 1955 and the production of certain other chemicals has also risen.

New plants are planned or under construction, the largest of which is the Ente Nazionale Idrocarburi factory, now nearing completion near Ravenna. It will produce about 150,000 tons of synthetic ammonia a year, which will be used for the production of 600,000 tons of nitrogenous fertilisers and 35,000 tons of synthetic rubber of the GRS type.

**France.** Present consumption of natural gas by the chemical industry, 100 million cubic metres, accounts for 37 per cent of the total consumption of natural gas. It is used mainly for the production of ammonia and nitrogenous products. Natural gas

was at first substituted for liquid petroleum products, particularly fuel-oil, in producing hydrogen and nitrogenous products and its use has enabled them greatly to expand production. It is also the basic element in a new chemical industry (ammonia and acetylene). When the Lacq gas deposits are exploited the situation will change.

**Roumania.** Natural gas and by-product gas from petroleum extraction were used in the chemical industry in the proportion of 14 per cent in 1954. The Roumanian petrochemical industry has been operating for only 10 years and is a large-scale user of natural gas, mainly for:

nitrogenous fertilisers, the whole output of ammonia being obtained by cracking methane into a synthetic gas; lamp-black, low pressure gas from the upper layers of wells being used; formaldehyde, formic oxide, oxalic acid, carbon tetrachloride, etc.; acetylene, which is produced from methane by electro-cracking or partial oxidation.

A considerable expansion of the acetylene industry is contemplated and in developing it during the next few years, it is proposed to include vinyl plastics, nitriles, acrylic synthetic fibres and other products, as well as acetic acid, acetone, etc. It is also intended to produce synthetic glycerine, rubber, plastics of the polystyrene type, ethylene oxide, synthetic glycerine, ethyl spirit and other products.

### SIMA's Annual Convention

At its Sixth Annual Convention at Eastbourne from the 24 to the 27 October 1957 the Scientific Instrument Manufacturers' Association will consider the outward-looking topics of meeting the challenges of the future, especially that of the European free trade area. One of the four separate discussion panels of the convention will be nucleonics and will be devoted to the industrial uses, techniques and applications of nucleonic equipment. This is the first time a new branch of instrumentation is being made the subject of a complete convention panel.

### Annual Dinner of Pesticides Group

The pesticides group of the Society of Chemical Industry is holding its annual dinner on 21 October at the Windsor Castle, Victoria, London. Tickets at 18s 6d each, exclusive of drinks, may be obtained from Mr. G. L. Baldit, Plant Protection Ltd., Yalding, Maidstone, Kent.

### Natural Gas in the Production of Synthetic Ammonia in Italy

	1952	1953	1954	1955	Increase or Decrease 1952-55
Total production (tons) ...	236,965	296,862	365,193	424,195	+187,230
Index ...	100	126	154	179	+79
Percentage of production from:					
Natural gas ...	4.2	20.6	29.7	39.5	+35.3
Coke oven gas ...	63.8	45.6	40.4	38.3	-25.5
Producer gas ...	11.8	16.5	15.6	10.4	-1.4
Electrolytic hydrogen ...	20.2	17.3	14.3	11.8	-8.4

## First Remote Control Nitroglycerine Plant

LAST week for the first time, nitroglycerine was made in a completely remote controlled plant. After the preliminary testing, nitration was started at the Ardeer works of ICI Nobel division on 27 August. Start up of the new remote control panel, fabricated in the Biazzi Co.'s Swiss workshops, was supervised by Dr. Biasutti, of Biazzi, and Mr. T. J. Tobin, nitroglycerine superintendent at Ardeer.

The new unit first started to produce in February 1956 under semi-remote control. In this phase experience was gained for complete remote control. The plant was closed in July this year for structural alterations and the erection of the instrument panel and control desk in a reinforced concrete room away from the nitrating building.

Two television cameras observe the process vessels through a window and their pictures are relayed by closed circuit to be projected on two small screens on the main instrument panel. In addition to these visual aids, the technical staff can also hear the sounds of operation through microphones that link the nitrating room with the remote control centre.

## RIC Symposium on Newer Metals

A SYMPOSIUM on 'The newer metals', arranged by the Manchester and district section, Royal Institute of Chemistry, in conjunction with the Chemical Society and the Society of Chemical Industry will be held in the chemistry lecture theatre, Manchester University on 2 October.

Chairman for the first session, starting at 2.30 p.m. will be Dr. S. J. Fletcher. Mr. L. Ross Williams (UK Atomic Energy Research Establishment) will give a paper on 'Beryllium, its production and special properties'. Dr. F. Fairbrother will preside at the second session, starting at 3.45 p.m. The following papers will be presented: 'The extraction of zirconium', by Dr. A. Hock (Magnesium Elektron Ltd.), and 'Niobium, extraction and consolidation', by Dr. G. L. Miller (Murex Ltd.).

The meeting is an open one, but those intending to be present are asked to notify Dr. R. E. Fairbairn, ICI dyestuffs division, Hexagon House, Blackley, Manchester 3.

## New Carbonisation Plant

A carbonisation plant capable of producing 18 million cu. ft. of gas daily is to be built by the Stavely Iron and Chemical Co. Ltd. at Sheepbridge, Chesterfield. When completed in 1961 the plant will be the second largest in the area. The other, at Wingerworth, owned by the National Coal Board, was completed last year.

## Polymer Technology Conference

The Institute of the Rubber Industry and the Plastics Institute are to hold a conference on recent advances in polymer technology on Thursday, 27 February 1958, probably at the Institute of Civil Engineers, Great George Street, London SW1. There will be two general lectures, and parallel sessions of papers in the morning and afternoon.



## Overseas News

COMMERCIAL SCALE PRODUCTION OF  
SYNTHETIC MICA STARTS IN US

**SUCCESSFUL** completion of a melt of 80,000 lb. of Synthamica synthetic mica is reported from the US by Synthetic Mica Corporation, New Jersey. American interest developed in 1945 as a result of US perusal of a German process at the end of World War II, which process had reached the pilot plant stage.

As the US has been dependent upon foreign sources of mica, the US Bureau of Mines in 1947 began work on the synthesis of mica. A process was developed using internal resistance of the melt for heat and using the raw materials to contain the melt. Sheet-mica crystals were prepared two to three inches long on one side from melts of up to 10 tons. A method for reconstitution of smaller particles into sheets was also found.

On the commercial side, Mycalex Corporation of America undertook further development work, forming Synthetic Mica Corporation to carry out the work.

Synthetic Mica now prepare crystals of four inches by four inches by one-eighth inch routinely although the yield of such crystals is low.

To produce synthetic mica, a mixture of silica sand, calcined alumina, calcined magnesite, potassium silico-fluoride and an auxiliary source of potassium such as feldspar is produced. These are used in the proportions desired in the product, except that they are richer in fluorides and potassium to allow for losses in processing. Heating is carried out in an electric arc furnace up to 1,300°C to 1,400°C which is maintained until 40 to 50 per cent of the material has melted. The mass is then slowly cooled (one degree or less per hour) to room temperature. The rate of cooling is one of the most important factors leading to large crystals.

The type of mica prepared is of the fluor-phlogopite type ( $K_2Mg_6Ac_2Si_4O_{20}F_4$ ) as its synthesis is easier than that of muscovite. Large crystals (only a few per batch usually) are separated from the mass for use in vacuum spacers, etc. The remainder of the melt is crushed, ground, mixed with glass and other ingredients and moulded into final shapes.

As a result of its development work Synthetic Mica have been able to produce dielectric products, marketed under the name Supramica Ceramoplastic, which can operate at up to 500°C.

Possible Italian Ban on  
Colouring Substances

The office of the High Commissioner for Public Health, Rome, is reported to be studying the advisability of banning certain colouring substances used in the processing of foodstuffs and the manufacture of toys, wrapping paper and wall-paper.

The substances involved, which are all

derived from tar or coal, are quoted as: Yellow Naphthols Somalia GG, Grisodine Soudan I.O., orange I.O., Bordeaux B, ponceau 2R, ponceau 3R, eosine, flossine, rodamine, aniline blue (water soluble), light green, malachite green, methyl violet and nigrosine (black).

Dutch Firm Get South  
African Contract

A Dutch company, Werkspoor, have been awarded the contract to supply the urea plant which will be part of the £10 million expansion programme recently announced by African Explosives and Chemicals at Modderfontein, Transvaal.

The plant, which will form a significant proportion of the project, will be completed in 2½ years. Technicians will be sent out from Holland to operate it.

Italian Experts to Examine  
Negev Minerals

Three Italian specialists are going to Israel to study the possible commercial exploitation of the potassium salts, phosphates and sand for the production of glass, found in the Negev Desert.

Starch By-Product Plant  
Completed at Seoul

A plant for the production of starch and other by-products went on stream in early July on the outskirts of Seoul, South Korea. Owned by the Tongyang Food Industrial Co., it is expected to produce 7,200 metric tons of edible starch, 4,500 tons of glucose, 240 tons of dextrose, 990 tons of gluten and fodder, and 216 tons of corn oil during the first year.

German Co-operation in  
Italian Sulphur Industry

The Italian Sulphur Board, Ente Zolfo Italiani, is negotiating with a number of German business groups interested in prospecting for sulphur and modernising the Italian sulphur industry. The firms include Hochtief AG, Essen, Vereinigte Untertage und Schachtbau und Rheinstahl Industrie Planung AG, Düsseldorf.

Gold Treatment Plant  
Completed at N. Fremantle

A gold treatment plant at North Fremantle has now been completed by Cuming Smith and Mount Lyell Farmers Fertilisers Ltd. Sulphur from pyrite concentrates are obtained from the Gold Mines of Kalgoorlie Ltd., at Kalgoorlie. Small quantities of gold remaining in the concentrates from the mines will be extracted from the calcine resulting from the roasting of the concentrates for the production of sulphuric

acid. About 40,000 tons of pyrite concentrates will be treated annually at the plant.

The plant has been set up in an attempt to recover sulphur economically and thus ensure the State's independence from dollar sulphur imported from the US and Mexico at a cost of £250,000 annually. Lower-grade gold ores can also be treated and thus assist GMK Ltd. Cost of the plant is stated to be £53,000.

Dollar Enquiry for Polythene  
Laboratory Ware

The Chemical Rubber Co., 2310 Superior Avenue, Cleveland, Ohio, are seeking a UK source of supply of polythene laboratory ware, including beakers, bottles, jars, jugs, carboys, dropping bottles, centrifuge tubes, pipettes, cylinders, beakers, flasks, funnels, etc. The firm estimate that their annual orders would amount to between \$30,000 and \$60,000. Firms interested should contact Mr. M. L. Firestone, purchasing agent, quoting both f.o.b. and c.i.f. prices in US dollars.

Increased German Plastics  
Production

A 54 per cent increase in German plastics production is recorded over 1954 figures. Annual value is now £42 million. In the same period output of the plastics processing industry has increased by 64 per cent to £98 million. Prices of plastics products in 1956 were the same as in the preceding year, with 94 index points (1950 = 100).

Du Pont Plan Polythene  
Plant at Sarnia

Production of linear polyethenes is planned by Du Pont Co. of Canada. A plant to manufacture these will be erected at Sarnia, Ontario. A factory with facilities for polymerisation of ethylenic acid for the compounding of the finished product, is envisaged. To date, this type of plastics material is new to Canada.

US Borax's Joint Research  
Projects Dropped

Negotiations by US Borax and Chemical Corporation with Olin Mathieson, US, regarding formation of a joint concern for research into and possible production of boron chemicals (see CHEMICAL AGE, 13 July, p. 70) have been discontinued by mutual consent, US Borax reports. As the company now has its own laboratories, it is continuing its own research in the field.

South African/US  
Uranium Agreement

According to Barclays Bank, DCO, South Africa and the US have concluded an agreement regarding uranium supplies. Under this agreement South Africa, as a leading producer of low-grade uranium, will have access to stocks of the enriched metal suitable for application of atomic power to industry.

South African exports of 'prescribed materials' during the first half of this year have been valued officially at £22.7 million compared with £16.5 million in the same period of 1956.

It has been estimated that South Africa



has sufficient uranium oxide to sustain likely production for 61 years, compared with 16 years and 10 years respectively in the case of Canada and US output.

### American Herbicides used in South Africa

Two American herbicides, 4-(2, 4-DB) (4-(2,4-dichlorophenoxy)-butyric acid) and 4-(MCPB) (4-(2-methyl-4-chlorophenoxy)-butyric acid) may be used shortly in South Africa to control weeds in legume crops. These chemicals have been studied at the Agriculture Research Centre, Beltsville, Maryland, US.

South African chemists, however, are reported to be more interested in two experimental herbicides which are not yet commercially available: Simazin (2-chloro-4, 6-bis(ethylamino)-S-triazine) and EPTC (NN-di-n-propylthiocarbamate). In tests both have proved promising in areas where maize and peanuts are grown.

### Rhodesian Lime Production

A new lime works was opened at Shamva, in Southern Rhodesia, on 23 August, by the Rhodesia Cement Ltd. Intended to replace imports of hydrated lime from South Africa, the plant may later be extended with the aim of supplying the whole of the Salisbury area.

### Two New Plants Planned for the Philippines

A plant for the production of rayon and synthetic yarn from local alpha-cellulose materials is expected to start operations in the Philippines early in 1958. It is a joint Philippine-US venture. A glacial acetic acid plant, equipped with German machinery, will probably start by the end of this year.

### Scandinavian Plans for Sulphate Cellulose Plant

Norwegian interests have entered into negotiations with the Finnish Government for the construction in Finnmark of a Finnish-Norwegian wood processing plant designed to produce 30,000 tons of sulphate cellulose a year.

### Peruvian Fertiliser Plant on Stream by end-1958

It is now estimated that the Peruvian plant of Fertilizantes Sintéticos SA will come on stream towards the end of 1958. Initial annual output is planned as follows: 25,000 tons of ammonium nitrate for agricultural use and 5,000 tons of explosives; 1,500 tons of concentrated nitric acid for explosives; 15,000 tons of ammonium sulphate for agriculture; and 1,000 tons of anhydrous ammonia.

### East Germany to Invest in Oil Refinery

In order to make the Wintershall oil refinery at Luetzendorf, south of Leipzig, a leading refinery having an annual capacity for processing 500,000 tons of crude oil, the East German Government is to invest DM (East) 168 million (£16 million approx.) in it, the investment project to be completed by 1959.

Supplies of 400,000 tons of Austrian and 100,000 tons of Russian crude oil are

expected each year. It is estimated that the output after 1959 will be 480,000 tons of finished products annually.

It is planned to set up a new topping plant, a plant to remove asphalt from propane, with an annual capacity of 120,000 tons, a phenol refinery of 200,000 tons capacity a year and a sulphuric acid refinery with an annual capacity of 100,000 tons of lubricating oil and 50,000 tons of kerosene.

### Increased Polystyrene Production in Japan

Production capacity of polystyrene plastics is to be tripled by the joint Japanese-American company, Monsanto-Kasei Chemical Co., one of the two producers of polystyrene in Japan. From the present production of 300 tons, capacity will be increased to 1,000 tons monthly by September 1958.

The Monsanto-Kasei Chemical Co., which are one of the largest producers of polyvinyl chloride resins, compounds, fibres and plasticisers for vinyl resins, began operations in 1952. The company is the joint venture of Monsanto Chemical Co. of the US, and Mitsubishi Kasei Chemical Co. of Japan.

The only other producer of polystyrene in Japan is the Asahi-Dow Chemical Co., which produces about 400 tons monthly.

### Bunac D-74 New Secondary Rubber Accelerator

A new secondary accelerator for synthetic and natural rubber formulations is being offered by the industrial chemicals division of Olin Mathieson Chemical Corporation, Baltimore, US. It supplements such prim-

ary accelerators as diphenyl guanidine, Santocure, and Captax. It is stated to be particularly useful in compounding GR-S rubber, although it may also be incorporated to advantage in other synthetic rubbers and in natural rubber. The material is a dark, mobile liquid.

In GR-S tyre tread formulae Bunac D-74 serves a dual purpose. It produces a tread stock with a wide curing range, thus tending to minimise possibilities of undercuring and overcuring. It also improves resistance to cracking under repeated flexing, an important advantage in GR-S formulations. Compositions containing this new accelerator yield vulcanised products of improved cut-growth resistance without causing higher heat build-up under repeated flexing. In natural rubber formulations, such as tyre carcass stocks, Bunac D-74 is said to be valuable as a tackifying plasticiser as well as secondary accelerator.

This accelerator is added to the rubber mixes by the usual compounding methods. It may be incorporated in the gum matrix on a two-roll mill or in a Banbury mixer. It is also possible to disperse the activator in the liquid rubber latex and then coagulate the latex, or to mix it with carbon black and other solids and incorporate the blended materials into the rubber compound.

### Synthetic Fibre Plant for Peking

China is to have a synthetic fibre plant in Peking. Construction has already begun and the plant is due for completion in the early part of the Second-Five-Year Plan beginning in 1958. The plant will be capable of producing 380 tons a year of Chinlon, a nylon-type fibre, similar to the Russian Kapron.

## First-ever Zirconium Fabrications to be shown at New York Chemical Fair

THE first fabricated parts ever made from zirconium will be shown in the Coliseum, New York, when the 26th Exposition of Chemical Industries opens on 6 December. A heat exchanger, thermowall, valve and reaction tank will be shown in this metal. New sections this year will include a chemical and chemical materials section, a rocket and satellite section and laboratory materials and supplies section.

Among the new developments will be a triple-stage vapour fractometer, for laboratory work in the field of gas chromatography, and a process-vapour fractometer, for on-stream analysis in the processing plant. A Chromagraphette is to be shown, a portable desk instrument for the simple and rapid analysis of gases and vapourisable mixtures.

An application of laboratory methods to process control will be shown in the Autoanalyser, a machine providing continuous control of the process stream by measuring ratios or levels of concentration of selected components of such products as antibiotics, sugar, whiskey, electroplating and paper pulp. The process sample is introduced into a flowing stream of reagents, and the reactions are automatically recorded on a comparison scale.

Another analyser for measuring aberrations in the process stream uses infra-red rays. Rapidly alternating rays of filtered light from a sample cell and a comparison cell impinge upon a sensitive detector operating on the null balance principle. Any deviation in the sample generates a signal proportionate to the difference between the sample and the comparison standard.

Water softening and demineralising plants can be made automatic by units to be displayed that provide continuous automatic analysis for Silica concentrations and total water hardness. A research model electron ray pH meter is to be shown.

Plastics piping capable of withstanding pressures up to 1,000 p.s.i. and temperatures in excess of 220°F will also be on display. It is made up of a centrifugally-cast thermoset epoxy resin reinforced with multiple layers of seamless braided glass fibre sleeving.

Other new exhibits to be shown include a white cellulose filter cartridge of 5-micron density, Teflon-lined (tetrafluoroethylene polymer) steel pipe and fittings, chemically inert jacketed fittings for flexible hose used in handling chemicals and a liquid filled temperature control using no gears to transmit motion.

# New Developments in Engineering

## Many New Products Shown for First Time at Olympia

**M**ORE THAN 150 of the 500 exhibitors at the Engineering, Marine, Welding and Nuclear Energy Exhibition, being held at Olympia, London, until 12 September are showing new products. Some of these of interest in the chemical and engineering industries are reviewed below.

The exhibition was opened on 29 August by Sir Christopher Hinton, managing director of the Industrial Group of the UK Atomic Energy Authority. Sir Christopher said that the trebling of the size of the nuclear power programme was unlikely to demand the construction of a materially greater number of power stations than the 12 proposed in the original scheme. He added that it was proving possible to design reactors considerably larger than was originally envisaged.

On Wednesday the exhibition was visited by a party of members of the Institution of Chemical Engineers who toured the stands.

### Dag Dispersions

The important part played by 'dag' dispersions of colloidal graphite and colloidal molybdenum disulphide in the treatment or manufacture of various industrial products is featured by *Acheson Colloids Ltd.*, 18 Pall Mall, London SW1.

Items shown include finished and semi-finished parts (e.g. compressor blades), equipment pre-treated to provide 'built-in' dry lubrication (automobile piston and camshaft), packings and bearings in which 'dag' colloidal graphite is impregnated or incorporated, electrical and electronic accessories and many other examples from various industries.

A range of 'dag' products will also be shown including glass dispersions and the new rubber lubricant Gredag graphited grease, grade RB5.

### Recording Instruments

The *Accurate Recording Instrument Co.*, Aric Works, Garth Road, Lower Morden, Surrey, are showing, among their standard ranges of temperature gauges, pressure gauges, controllers and recorders, an improved indicating thermostat which has been specially designed for industrial uses. The instrument is positive in action, and can be supplied with various bands of temperature from  $-100^{\circ}\text{F.}$  to  $+500^{\circ}\text{F.}$  It is fitted with a micro-switch which is rated at 10 amps. at 250 volts AC or 440 volts AC and can be supplied either with a brass, stainless steel or monel metal bulb.

Also featured is a multi-reading tank gauge of the hydrostatic type, which can give up to five readings from different tanks on the same dial. The instrument is available either fitted with a hand pump, the hand pump being totally enclosed, or,

alternatively it can be supplied with a suitable control for use on a compressed air line. This tank gauge when used in conjunction with a constant air flow can be fitted, if necessary, with high and low level alarms, and/or with a remote repeating indicator.

### Stainless Steel Tubing

Examples of seamless steel tubing in stainless steel and other metals are displayed by *Accles and Pollock Ltd.*, Oldbury, Birmingham. These include stainless steel tube in the 'as drawn and polished' condition; small diameter precision tubing, including diesel fuel pipes, high pressure, multibore, composite, capillary, bourdon and instrument pointer tubing. Specimens of special sections and seamless drawn tube in many shapes are also shown. Tubing in zirconium, tantalum and titanium, molybdenum, vanadium and niobium is also available. Other interesting items exhibited were seamless stainless steel flexible tubing, thin walled tubing, flexible joints, extended surface tubing.

### Vacu-Blast Machines

Machines which provide dust free shot blasting are shown by *Vacu-Blast Ltd.*, 291 Aberdeen Avenue, Slough, Bucks. Applications of Vacu-Blast machines include the cleaning of heat exchangers and pressure vessels, scale removal, and preparation for metal spraying. In the rubber and plastics industry the machines can be used for mould and roll cleaning.

### Scale Removal Gelly

Various metal treatment processes developed by the *Walterisation Co. Ltd.*, Purley Way, Croydon, London, for rust-proofing and paint-bonding are illustrated on this company's stand. The latest Walterisation process deals with the technique of cold forming and extrusion. A new addition to the specialised treatments is *Waltergel*, a gelly for the removal of scale from girders, plate and other hot rolled steel fabrications.

### Kanigen Plating Process

Metalwork and plastics treated with Kanigen, the new chemical nickel-phosphorus plating process now being operated by *Albright and Wilson (Mfg.) Ltd.*, Oldbury, Birmingham, are featured in a special section. Chemical polishing processes are used for treating aluminium and its alloys and copper alloys, including basis and cartridge brass and gilding metals. Electrolytic polishing also has an important application to stainless steels, which are difficult to polish mechanically.

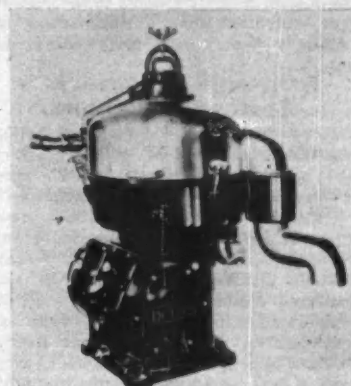
Kanigen plate is extremely hard (1,000 VPN after heat treatment) and corrosion and wear resistant. The solution has 100 per cent throwing power and deposits a continuous and completely uniform plating

on even the most complex components. An important advantage of Kanigen is that, in addition to its application to most metals in general engineering use, it can plate such non-metallic materials as plastics, ceramics and glass.

Kanigen exhibits include cast iron metallic housing for moderator reactor control and cast iron tap valve, which has been operating under corrosive conditions in a chemical plant.

### Centrifugal Separators

Centrifugal separators of interest to the chemical engineering, food and process industries are exhibited by *Alfa-Laval Co. Ltd.*, Great West Road, Brentford, Middlesex. Among the later types of centrifuge



*De Laval QX 210 nozzle separator for continuous solid separation in the chemical, process and food industries*

is the automatic self-opening separator. By means of a special hydraulic device solids are ejected from the centrifuge bowl while it is running at full speed, thereby eliminating any shut-downs for bowl cleaning. This machine is in use for oil purification, clarification of beer wort, molasses, dye-stuffs liquors, caustic lye and general chemical and process problems.

For starch separation and concentration, and gluten separation and for such problems as fish oil separation, classification of china clay and other solids, etc., there are the De Laval nozzle separators, the larger of which is driven with a 65-h.p. motor and can handle up to 80 tons of liquor/hour.

Other De Laval equipment includes the deslugger—the horizontal centrifuge for continuous solids separation, plate type heat exchangers in stainless steel construction, and easy-clean stainless steel centrifugal pumps.

### Variable Speed Gears

Kopp variable speed gears are displayed by *Allspeeds Ltd.*, Oakenshaw Works, Clayton-Le-Moors, Accrington, Lancs. These gears are available in sizes from 1/33 to 15 h.p. All units have a stepless speed variation of nine to one (one-third to three times the input speed) and transmit constant horse-power throughout their output speed range. The speed setting



## ENGINEERING EXHIBITION

control is exceptionally light, sensitive and accurate. Models shown include units (a) with free shaft ends (b) with flange mounted motors and (c) with built-on reduction gears.

### Corrosion-Resisting Castings

APV-Paramount Ltd., Manor Royal, Crawley, Sussex, suppliers of corrosion, heat-resisting and alloy steel castings produced by shell, CO<sub>2</sub> and orthodox sand moulding techniques, are exhibiting cast components in the finished and part machined condition. These include petroleum valve parts, chemical pump casings and impellers in a variety of stainless alloy steels. Of special interest in the nuclear energy field is a guide pan steel casting weighing some 800 lb. Through these pans the control rods are lowered to the reactor core thus demanding a steel casting of unusually high quality and dimensional accuracy.

### Testing Machinery

A new and simplified range of testing machines is exhibited by *W. and T. Avery Ltd.*, Soho Foundry, Birmingham 40. They are represented by universal machines of 50 tons and 12,000 lb. capacities, both equipped with load and extension recorders. Demonstrations are given of a midge Pulsator fatigue testing machine, to take maximum loading up to 660 lb., together with a similar machine of 6 tons capacity. Other exhibits include an impact testing machine to carry out both Izod and Charpy tests, a range of hardness testing machines and a spring testing machine.

### New Filter-Separator

The Purolator filter division of *Automotive Products Co. Ltd.*, Leamington Spa, has a new bulk fuel filter-separator on display for the first time. A main advantage of this new unit is that it is compact. It also performs two important functions at the same time, by extracting water from the fuel as well as any solid particles, thereby eliminating the necessity of an additional filter.

The efficiency of water removal depends to some extent on the operating conditions,

but Purolator filter-separators are stated to be 99.98 per cent efficient in most circumstances. All solids greater in size than five microns are removed by the filter together with a large proportion of smaller particles. Models suitable for flow rates from 250-750 g.p.m. are available.

Automotive Products are also exhibiting on a second stand a range of Lockheed long-life hydraulic cylinders. Examples of control valves, relief valves, semi-rotary slave valves, etc., pumps, the new model '350' hydraulic motor and other associated hydraulic and electro-hydraulic units are shown in a high quality production finish.

### Industrial Oscilloscope

A simple oscilloscope specially intended for use on industrial electronic equipment such as electronic welding controls, electronic motor controls, temperature controllers, and all circuits, no matter how intricate, using mains frequencies is displayed by *Bates and Bates Ltd.*, Blackburn Street, Liverpool 19. This is the Synchro-heat industrial oscilloscope, type O/50. With only one adjustment knob (focus/on-off) setting up procedure is reduced to a mere switching on. Both A.C. and D.C. signals may be viewed on the clear three-inch screen, which is calibrated in volts. Any voltage up to 500 may be measured and the wave shape observed at the same time.

To eliminate synchronisation and time-base setting problems the time base is locked to the mains frequency.

### Diaphragm-Type Level Control

*British Arca Regulators Ltd.*, 34 Millbank, London SW1 have several new items on display. A diaphragm-type level controller (series C30) has been designed to meet the need for a simple robust controller with a sealed sampling tank, to give accurate proportional control over a specified liquid level range. It is stated to be suitable for operating any pneumatic or hydraulically operated valve.

A diaphragm operated inverted valve fitted with gland cooling is also shown. This type of valve is claimed to be suitable for pressures up to 1,400 p.s.i.g. and

temperatures up to 800° or 900°F. These valves are manufactured in all sizes from ½ in. to 6 in. bore and are of single seat construction with balancing piston.

Also new are standard diaphragm operated valves manufactured in all sizes from ½ in. to 12 in. which are suitable for pressures and temperatures up to BST 'J'. Valves are available with single-seat or double-seat intervals which can be arranged to give the desired pressure and temperature conditions and flow characteristics.

### Gas Welding

Latest developments in gas welding and cutting are dealt with on the stand of *British Oxygen Gases Ltd.*, Spencer House, St. James's Place, London SW1. On show is the Saffire range of equipment for gas welding, cutting, gouging, heating, flame cleaning, rivet washing and other specialised tasks. Handcutting blowpipes, from the same range and able to cut mild steel up to 12 in. thick, are also shown.

Also exhibited is the Argonarc process, of interest in nuclear engineering due to its recent use in the construction of the Dounreay fast breeder reactor. It was used in the construction of a 30-ton atomic reactor vessel where precision welding was essential. The Argonarc cutting process is being demonstrated for the first time.

### Fabricated Metal Work

Manufacturers of sheet, plate and sectional metal products, *Fredk. Braby and Co. Ltd.*, 352-364 Euston Road, London NW1, are showing typical examples of fabricated plate and sheet metal work, as well as aluminium industrial holloware, storage equipment ducting, 'Bar-form' metal partitions, etc.

### Aluminium for Industry

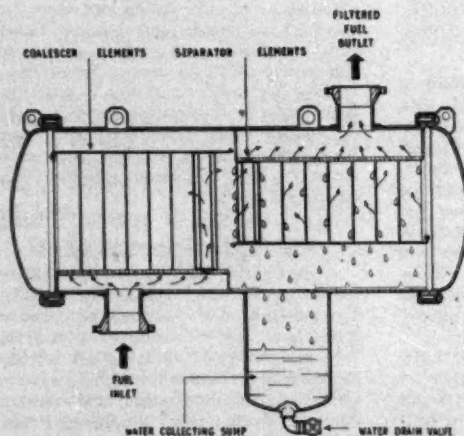
Samples of the new small positive-grip pattern (PGP) treadplate, and a selection of heavy sections for structural engineering are displayed by *The British Aluminium Co. Ltd.*, Norfolk House, St. James's Square, London SW1. The excellent low temperature properties of aluminium are illustrated, with their possible use for the carriage of liquid gases. Applications of aluminium in chemical engineering and atomic energy plant are also depicted.

### Dial Thermometers

A range of dial thermometers, recorders and controllers are displayed by *The British Rototherm Co. Ltd.*, Merton Abbey, London SW19. There is a range of thermometers with dial sizes from 1 in. to 7 in. in a wide variety of temperature ranges, presentations, stem lengths and diameters for laboratory purposes.

Mercury-in-steel thermometers, such as distant reading and rigid stem models with 4-in., 6-in., 8-in. and 10-in. dials, wall, panel or bracket mounting, in modern styled indicator cases with bulbs and capillaries, are shown, together with single- and dual-pen recorders designed for wall or panel mounting. There are also portable recorders.

An interesting range of compact and



*Purolator bulk fuel filter-separator made by Automotive Products Co.*



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reliable mercury-in-steel temperature on/off controllers is exhibited including dial thermometers with electric contacts as well as heavy duty indicating and non-indicating models with fixed or variable differentials.

### Thermostatic Steam Trap

Velan steam traps for use on all pressures up to 2,500 p.s.i., and for temperatures up to 1,100°F., are displayed by *The British Steam Specialties Ltd.*, Fleet Street, Leicester. On show for the first time is the new Velan Monofloat thermostatic steam trap, which is of revolutionary design, and is claimed to be suitable for use with unit heaters, etc. Also on show is a range of Vee-Reg globe regulating stop valves, in bronze and steel, fitted with stainless-steel disc and seat. A special feature will be the new Vee-Reg Rotork electrically-operated valve for remote control, introduced for the first time.

Designed to give audible warning to ensure the safe filling of all oil-fuel storage tanks is the Ventalarm whistling tank-full signal.

### New Lead Alloy Anodes

Examples of lead alloy anodes for current cathodic protection are shown by *Cathodic Corrosion Control Ltd.*, Duncan House, Dolphin Square, London SW1. The alloy used, C x 3, has been proved most effective in sea water or in water where resistivity is below 1,000 ohm/cms. The anodes are easily fabricated and mounted and the mechanical toughness of the alloy is high compared with other anode materials such as graphite and silicon iron. They also have exceptionally low rate of consumption. Much depends on the formation of a complex lead peroxide film which, being electrically conducting, causes the anode reaction to take place on its outer surface. This means that, following an initial consumption of the alloy to form this complex, it becomes virtually permanent and the corrosion of the metallic lead is greatly reduced.

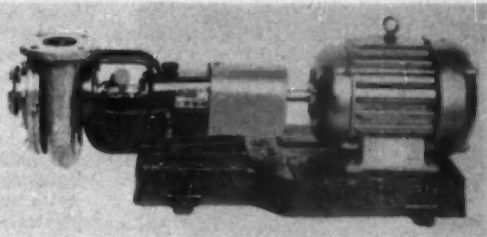
### Feed Water Regulator

A complete 3-element feed water regulator installation arranged as a working set-up is on show for the first time by *Copes Regulators Ltd.*, 9 Southampton Place, High Holborn, London WC1. Also of interest is this company's thermostatic/electrical high and low water alarm which can give audible and visual warnings and also can cut off fuel supply under emergency conditions. Steam assisted spray-type desuperheater units are also exhibited.

### Vacuum Extraction Pump

On show for the first time by *British LaBour Pump Co. Ltd.*, Blundell Street, London N7 is a vacuum extraction duty pump, type SGHL, which has been specifically developed for use with evaporator, vacuum filter, condenser installations, etc. The pump will draw liquor from vessels under vacuum equivalent to 28 inches of mercury. It is available in the full range of LaBour's corrosion-resistant alloys where appropriate. The design incorporates a seal-bath whenever the gland is fully

*This centrifugal pump, type Q, by British LaBour, is claimed to handle a large proportion of gas or vapour with the liquid*



immersed at all times. Sectional models are on show to demonstrate the basic features.

New bearing and impeller assemblies have been used in pumps, types UHL/UPL. A sectional model is shown of a flooded suction pump (representing types DZT and Q) and indicates its ability to handle a high proportion of gas or vapour with the liquid.

A new development is type UZ, with a Vulcoferran lining and a special mechanical seal arrangement. It is intended particularly for handling hydrochloric acid, ferric chloride solutions, etc., where the use of metals or alloys is prohibited either because of their unsuitability or high cost.

Also exhibited is type BG, a development of the La Bour type G, a vertical pump which operates without a packed gland mechanical seal. The pump is recommended for handling dangerous/corrosive liquors where maintenance must be reduced to an absolute minimum.

### Applications of Duthane

The engineering components division of *Dunlop Rubber Co. Ltd.*, is displaying components made from Duthane, a new synthetic rubber with exceptional abrasion resistance which has a polyurethane base; also standard rubber products such as antivibration mountings, and rubber springs; and examples of precision components made to customers' requirements.

Dunlop's new Maxrate V-belt is shown by the belting division. This belt incorporates Terylene cord of exceptional strength. Also shown are flat transmission belting and conveyor and elevator belting of all grades and types for the chemical and cement industries, etc., with special emphasis on the heat-resisting types.

Expansion joints in circular water systems and for use in steam, water and oil will be exhibited by the hose division.

### Laboratory Press

A 10-ton laboratory press of the standard Finney range has been fitted as a demonstration model by *Fawcett-Finney Ltd.*, Berkley Street, Birmingham 1, to show the working of the Greer Mercier hydro-pneumatic accumulator, Finney Mercier pressure switch and hydraulic gauge protection valve.

The company is also demonstrating the plastics Greer Mercier accumulator which consists of a small gear pump, control valves and a transparent plastics shell containing a rubber bag, clearly showing the convolutions of a bladder under working conditions.

Also on show is the Finney P3G pump

unit which can be supplied to deliver either 3 or 6 g.p.m. at 3,000 p.s.i. and 5,000 p.s.i. It is entirely self contained and the unit incorporates a pump unloading mechanism giving a differential of 10 per cent. Infinitely variable pressure is obtained by the Finney variable pressure control which is hydraulically operated lifting the pump suction valves off their seats at a predetermined pressure.

### Fibreglass Pipewrap

Pipewrap and various types of air filters suitable for engineering and industrial use are on display by *Fibreglass Ltd.*, Ravenhead, St. Helens, Lancs. Other fibreglass applications, although shown as being for marine applications, include insulation of pipes, trunking, boiler, engine-room casings, cold chambers, etc.

Fibreglass reinforced plastics are easily moulded and can contribute a considerable saving in weight. The company is stressing that the product is particularly suitable for corrosion-resistant piping and ventilators.

### Water-Tube Boiler

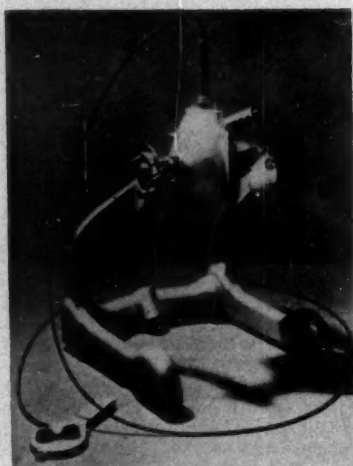
*Fraser and Fraser Ltd.*, London E3, are showing their water-tube boiler which takes up minimum space and is adaptable for all kinds of fuel. The model on the stand is the 'Fraser' patent dual circulation water-tube boiler, two-pass horizontal drum type, which has working pressure of 150 lb. p.s.i., a normal evaporation of 3,200 lb./hr., with standard steel cased refractory lined combustion chamber for hand-firing coal or coke. The dual circulation system has been specially developed for operation with indifferent quality feed water, eliminating the principal disadvantage of water-tube boilers.

### Gamma-Ray Equipment

Manufacturers of gamma-ray equipment and accessories, *Gamma-Rays Ltd.*, Foundry Lane, Smethwick 40, Staffs. have as their principal exhibit, what is claimed to be the largest industrial gamma-radiography machine in this country. It is intended for permanent installation in a radiographic room similar to those used for the larger X-ray sets of high kilo voltages. It is stated to be capable of adaptation to contain 2,000 curies caesium-137 when these become available for industry.

Also new is the iridium decay clock. The user of several isotopes of iridium (used for pipe inspection, welding fabrication, etc.), which has a half-life of 74 days, can set the respective strengths on the clock, on receipt from Harwell and thenceforward simply read the scales any time to ascertain

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Model ASS/51 container for 600 millicuries cobalt-60, made by Gamma-Rays Ltd.

the strength of any or all without recourse to charts or calculations.

## Lifting Appliances

Exhibits on the stand of *Felco Hoists Ltd.*, 29 Cromwell Road, South Kensington, London SW7, include selections from the range of Felco hand- and power-operated lifting appliances. There are displays of hand-operated triple gear chain pulley, blocks of super roller bearing and standard types, overhead travelling trolleys and travelling chain blocks incorporating the desirable features of short headroom, light weight, robustness and maximum safety. New items are electric wire rope pulley blocks with exceptionally short headroom and Felco Simson hydraulic jacks of 10, 20 and 30 tons capacity.

## Isopanel Heating Units

Featured on the stand of *Isopad Ltd.*, Barnet By-pass, Borehamwood, Herts, are the No. 110643 Isopanel and a model of the No. 19 road tanker, showing a generator set mounted behind the driver's cabin. This Isopanel is of the type used to cover the surface of a road tanker. These are flexible electric heating panels and consist of a resistance wire, electrically insulated by glass yarn, high temperature varnished, inter-woven with glass yarn or fitted to a glass cloth base, to form a flexible heating panel, thus making a complete electric circuit. The size of the Isopanel is chosen

to suit the design of the tanker, surface areas of 10 to 20 sq. ft. being generally covered by one electrical circuit unit. The Isopanel is terminated according to temperature, either by the heating element itself, or by specially constructed leads.

Two basic assemblies are employed. In one the Isopanel, which is fitted with eyelets along its circumference is fitted directly to the tanker shell, sub-dividing it into a number of heating zones (between six and 18, according to size of tanker and surface covered), each zone representing an independent electric circuit. Three to 3½ in. of high-temperature lagging is applied over the Isopanel and a second metal outer shell is then fitted. This shell is made in such a way that sections can easily be removed. In the second type of assembly, lagging boxes are made by the tanker manufacturer, incorporating 3 to 3½ in. of glass wool lagging, having the Isopanel fitted to its inner surface. The whole assembly is made to follow the shape of the tank and screwed home to strengthening members surrounding the tank. In case of maintenance, the lagging box is simply removed as one unit.

In either construction, outlet valves are heated by Isovalve heater assemblies, tailored to suit each particular unit. Charge and discharge pipes are also often heated by Isotapes, while flexible heated hose can be provided.

## Induced Draught Equipment

Specialists in the design and manufacture of equipment for moving or compressing air and gases, transferring heat from one fluid to another, and air and gas cleaning plant, *James Howden and Co. Ltd.*, 195 Scotland Street, Glasgow WC5, are exhibiting an induced draught fan wheel and shaft together with a smaller forced draught fan wheel driven by a Howden high-speed steam engine and a Howden package air preheater suitable for auxiliary boilers and smaller industrial plants and power stations. A model of the latest type of Howden-Ljungstrom air preheater is exhibited in the form of a scale model, of the rotary regenerative type. A 200-mm. Howden compressor is shown with casing sectioned to display the rotors.

## P.T.F.E. Dry Bearings

Exhibits by the *Glacier Metal Co. Ltd.*, Alperton, Wembley, Middlesex, include anti-friction whitmetal, a standard range of tin and lead base metals for all applications in which Babbitt metal is used, a

Glacier centrifugal oil filter and Glacier p.t.f.e. dry bearings. These latter are a standard range of bushes, thrust washers and strip made from steel-backed sintered porous bronze which is impregnated with p.t.f.e. (polytetrafluoroethylene) to provide an anti-friction surface requiring no lubricant. They are stated to be particularly suitable where bearings are inaccessible and difficult to lubricate. These dry bearings are also ideal where oil contamination is a problem, where lubrication is difficult because of extreme temperatures and in chemical applications where bearings have sometimes to be run submerged in alkalis, acids or other liquids.

## Explosion Suppression

Included on the stand of the *Graviner Manufacturing Co. Ltd.*, Gosport, are industrial explosion protection and suppression equipment (see *CHEMICAL AGE*, 1 June, p. 927), thermostats and overheat switches, fire detectors, fire extinguishing apparatus and specialised nuclear energy equipment. A working model and a continuous film illustrate how the industrial



Explosion detector by Graviner

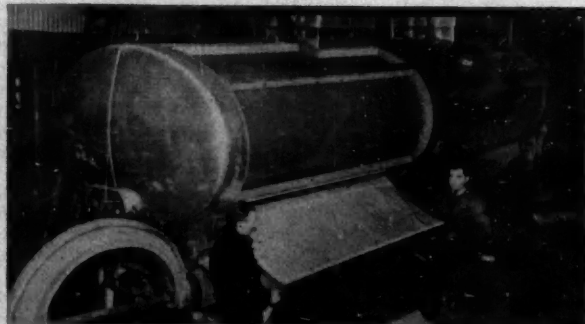
explosion protection and suppression equipment operates. The new spot-a-fire resetting detector and Gravinette can be seen together with fire wire and fire-fighting apparatus.

## Metals and Nuclear Energy

'Metals and nuclear energy' is the central theme of metals division, *Imperial Chemical Industries Ltd.*, Imperial Chemical House, Millbank, London SW1. Newer metals such as zirconium and niobium are exhibited. Integron integral steel-finned tubing for heat exchangers is also displayed. In a section devoted to oil-refining a range of tubes for process heaters, intercoolers, dual-gauge tubes, bi-metal tubes and plates are shown. ICI titanium is displayed with particular reference being made to its corrosion resistance in chemical plant.

Products of a subsidiary ICI company, *Marston Excelsior Ltd.*, are also exhibited with nuclear energy applications being prominently featured.

The uses of titanium are illustrated by a steel vessel lined with titanium and a gas nozzle fabricated from the metal. Examples of flexible fuel tanks in Flexelite, a material made from Hycar rubber, and in Marlite, a new lightweight product recently developed by Marston Excelsior, can be seen on the stand. Both products are said to have excellent fuel-resistant properties and uses vary from general purpose storage tanks to



The photograph shows Isopanel combined heating and lagging boxes being fitted to a road tanker



## ENGINEERING EXHIBITION

fuel tanks for aircraft. A model of a floating water purification plant for use in river water is on view.

### Scale-Free Heating

Efficient production to-day demands the elimination of scale formation in high-temperature heating processes. This demand is stated to be met by the Equiverse system, devised by the *Incandescent Heat Co. Ltd.*, Cornwall Road, Smethwick, Birmingham 10, which is shown in action on the stand of the *Gas Council* (1 Grosvenor Place, London SW1). The Equiverse system incorporates a thermal cycle which can be applied to existing or new furnaces, static or continuous, large or small, and covering all heating jobs from 750°C to over 1,300°C. Features of the system include automatic atmosphere control to maintain reducing conditions in the furnace; pre-heating of combustion air to ensure easy attainment of working temperatures; completion of combustion by the introduction of secondary air into the flue gases; recirculation of the flue gases to increase their velocity through the regenerators.

### Hydrostatic Contents Gauges

Various ranges of instruments are being exhibited by *KDG Instruments Ltd.*, Manor Royal, Crawley, Sussex. Of interest are the hydrostatic contents gauges and controllers which are stated to be suitable for the great majority of liquids. There is a new 10-in. wall or flush panel mounted hydrostatic tank contents recorder with a 7-day or 24-hour electrical or mechanical movement, and a new twin and triple indicating contents gauge operated from a single transmitter.

Working models of the tank contents controller and new contents recorder can be examined, as also models of various pressure switches (ranges 0.1 in. to 5,000 p.s.i.) including liquid level and micro-pressure switches, and also thermometers.

### Centrifugal Fan Impeller

A wide variety of equipment is on show by *Keith Blackman Ltd.*, Mill Mead Road, London N17. For induced draught and similar applications, there is a 75-in. dia. type AR Aerofoil section centrifugal fan impeller. Typical duty of this fan is 60,000 c.f.m. against 4.5 in. t.w.g. when running at 510 r.p.m. A 10-in. dia. induced draught and grit arrestor fan is available for application to industrial and commercial boilers. This unit is shown working. There is also a model of the PD-KB design 6P type multitubular dust collector. This is suggested for the removal of fly ash from flue gases of medium-size industrial boilers of all types, the recovery of valuable dust from crushing and grinding plant and their associated conveyors, etc. The makers claim high collection efficiency at moderate resistance, maximum freedom from dust erosion, accessibility for maintenance and service, low cost of erection and flexibility of arrangement.

### Piston Valves

The main exhibit of *Richard Klinger Ltd.*, Klingerit Works, Sidcup, Kent, is a range of Klingermatic piston valves,

designed for remote control of filling lines, emergency valves where rapid operation is required and for similar applications. A 6 in. Klingermatic valve is shown which supplies a line with branches carrying 1 in., 2 in. and 3 in. Klingermatic valves. The valves are operated by push button from a Lockheed hydraulic control unit; each valve can be operated individually.

Other exhibits by this company include Klingerit compressed asbestos jointing for all pressures and temperatures, superheated and saturated steam, chemicals, gases and hydrocarbons, Klinger Oilit compressed asbestos jointing specially designed for oils and solvents; and Klinger Acidit, compressed asbestos jointing designed for most organic and inorganic acids at highest pressures and temperatures.

### Liquid Relief Valves

A range of new liquid relief valves is being shown for the first time by *Megator Pumps and Compressors Ltd.*, 43 Berkeley Square, London W1. These valves, made of bronze with cadmium-plated carbon steel valve springs, incorporate a number of unusual features.

Also being shown for the first time will be a new version of their mobile industrial pump with the pump set mounted on a robust four-wheeled metal trolley, with welded tubular handle and bracing struts. The standard range covers capacities between 8 and 50 gallons per minute, but greater capacities are available to order. The set can be adapted, if required, to carry a length of flexible hose.

### Metalock Process

The Metalock process of effecting cold repairs to cracked or fractured castings is shown by *Metalock (Britain) Ltd.*, Grand Buildings, Trafalgar Square, London WC2. The system entails a number of steel 'stitches' being inserted across a crack or fracture, each stitch comprising a row of holes and interconnecting channels cut in the metal, into which the bonding metal is inserted. A succession of Metalock keys is driven into each cavity by pneumatic hammer and subsequently peened.

Also featured is the Furmanite method of sealing steam leaks under pressure, without shut-down.

### Nickel Exhibits

*The Mond Nickel Co. Ltd.*, Thames House, Millbank, London SW1, are showing how many engineering problems can be solved by the right choice of materials. The subjects covered include corrosion resistance, surface protection, physical properties, mechanical properties and weldability. Materials include SG iron in addition to many nickel-containing alloys and steels.

### Metal Spraying Pistol

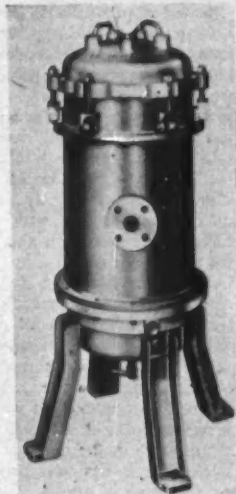
A new metal spraying pistol, mark 33, is introduced by *Metalisation Ltd.*, Barclays Bank Chambers, Dudley, Worcs. Its frictionless method of controlling speeds by what is said to be a unique magnetic control gives infinite variation without loss of power. The Norton process of spraying Rokide coatings is also being featured. The coatings are the oxides of

aluminium, zirconium, etc., which have special applications due to their thermal properties. High melting point and low thermal conductivity permit high operating temperatures.

Visitors can see examples of pressed tools made by a new combination of sprayed metal and plastics. In addition samples of sprayed powdered materials, such as nylon and Lument will be shown, with the tools for their application.

### Pumps and Filters

Exhibiting on the stand of *The Mono Group of Companies*, 1 Sekford Street, London EC1, are Mono Pumps Ltd. and Menrow Ltd. Mono Pumps are showing a new hygienic pump, Mono Kwikleen



Multi-purpose treatment unit by Menrow Ltd., suitable for industrial filtration and oil dehydration

K63, which can be quickly and easily dismantled for sterilisation. All internal surfaces are polished stainless steel and the stator is of non-contaminating composition. The pump is self-priming up to 25 ft. and can be used for vacuum extraction duties. It is said to be suitable for high-temperature short-time processing and has a capacity of 3,000 gal. per hour with a maximum pressure of 30 p.s.i.

The P12 Mono powder pump is being demonstrated on the stand. It is claimed that very low h.p. is required to drive the pump and the use of air for fluidisation is kept within reasonable limits.

Among new equipment shown by Menrow Ltd. are the horizontal B25 pressure and multi-purpose treatment M1 unit. Type B25 has a capacity of 250/300 gal. per hour and provides a large filtering area in a small space. The M1 unit has been designed to utilise the highly adsorptive qualities of modern granular media, to separate solid dispersants from fluid by filtration and to complete the treatment of oil by effective dehydration.

### Fabricated Niobium

Niobium rod, sheet, wire and tube has now been added to the range of metals which are supplied by *Murex Ltd.*, Rainham, Essex, in fabricated form. Tungsten, molybdenum, tantalum and zirconium are also available in the form of rod, sheet,

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wire and fabricated parts. Niobium and zirconium are of particular interest to the nuclear energy industry, while corrosion-resistant plant fabricated in tantalum is used by the chemical industry. Various items of chemical plant fabricated in tantalum are shown, including sections for use in plant for hydrochloric acid production. Welded tantalum and zirconium tubes can now be made available commercially.

Sections of a high temperature vacuum furnace fabricated in molybdenum are displayed, while many spinnings in molybdenum are available. Recently it has been found possible to form tungsten dishes and crucibles by spinning, and examples are shown.

### New Welding Electrodes

Among new products shown by *Murex Welding Processes Ltd.*, Waltham Cross, Herts, are welding electrodes, a new automatic welding machine, new welding transformers and new welding accessories. One of the most important of the new electrodes is the Fastex 100, specially developed for the rapid welding of pipe joints *in situ* using the 'stovepipe' or vertical downwards technique. An extremely fast deposition rate can be obtained with this electrode which produces smooth and regular welds with an absence of undercut. The Fortrex 35A electrode has been designed for the welding of the extra thick plate which is being increasingly used for nuclear energy vessels and similar applications. The main feature of this new electrode is that the weld metal provides extremely high impact properties throughout the whole section of the welded joint at sub-zero temperatures. Certain types in the range of Murex stainless steel electrodes have been modified to meet the needs of nuclear fission and other high temperature requirements.

### Barrier Creams

*Rozalex Ltd.*, 10 Norfolk Street, Manchester 2, will be showing several recently-developed additions to their range of dermatitis barrier creams. Recently added to the Rozalex range is the No. 12 cream, containing a light screen to filter the ultra-violet fraction of light which may photo-sensitise the skin, causing erythema, exudating dermatitis and skin cancer. Originally developed to protect the skin against the effects of photo-sensitisation caused by pitch and tar, it is now used widely where some of the latest arc welding techniques are employed.

Of interest to nuclear engineers is a new cream specially formulated to facilitate the rapid decontamination of protective clothing worn by personnel exposed to radioactive materials.

### Noral Aluminium

On the stand of *Northern Aluminium Co. Ltd.*, Banbury, prominence is given to applications of Noral aluminium in nuclear energy, and to the contribution that the company's new production equipment is making to engineering generally. A large structure in Noral aluminium, fabricated by the Fairey Aviation Co. Ltd. for the UK Atomic Energy Authority, dominates one area of the stand. Other examples of com-

ponents for nuclear energy applications will indicate the good working properties of Noral alloys.

### Worm Reduction Gears

Exhibits of *S.E. Opperman Ltd.*, Borehamwood, Herts, comprise worm reduction gears of single and double reduction types. Single right-angle types range from 1/20th to 20 h.p. Double reductions are of the horizontal right angle, vertical output or straight through output. Various types of geared motor units will be shown of single, double and triple reductions from 1/8th to 12½ h.p. These units are of spur and helical gear design with output shaft in line with motor.

### Uses of Protective Glass

'Glass as a protective material' is the theme of *Pilkington Brothers Ltd.*, St. Helens, Lancs, stand. Central feature is three types of viewing windows affording protection against various radiations.

One window measuring 3 ft. 6 in. by 2 ft. 6 in. and comprising 36 one-inch thick stabilised special plate glasses, illustrates one of the types of shield used for safety in nuclear research. An operator demonstrates how the window enables radioactive material in a 'hot' laboratory to be handled by means of remote-controlled mechanical hands. A slightly smaller window of the type used in hospitals to protect staff operating the linear accelerator from radiations is also displayed.

A third type is in the form of a tank containing a special clear liquid and having at each end one-inch polished plate glass, the inner glass being stabilised against darkening and the outer (observer's end) being unstabilised.

As well as illustrating safety shielding against radiation, pressure and blast, the stand presents special varieties of glass giving protection against heat and cold, light, sound, wear and corrosion screens and guards against splashes of dangerous liquids.

### RES Process Pump

Among the many new products shown this year by *Tangyes Ltd.*, Cornwall Works, Smethwick, Birmingham, is the RES process pump, the manufacture of which has been taken over by the company within the last few months. Although primarily intended for refinery and petrochemical works and made to the strict specification demanded by this industry, they are also in use and of great value to other industries such as the food or the paper manufacturing industries.

Another contribution from the pumps division is the close coupled pump—an extension to the present Tange AR range of centrifugal pumps. This design is available in four sizes, with 1½ in., 2 in., 2½ in. and 3 in. outlet.

### Aluminium Welding Unit

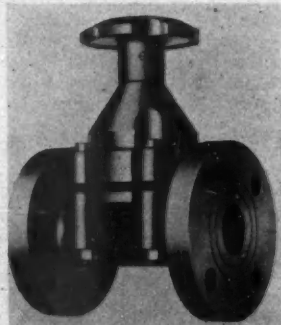
Two new models of the Saturn-Hivolt surge injector argon arc welding unit Mk. II and Mk. III are introduced by *Saturn Industrial Gases Ltd.*, Gordon Road, Southall, Middlesex. They are developed directly from the Mk. I machine but, among other improvements, have a built-in

transformer. They are for the welding of aluminium, its alloys and stainless steel and have a current range of 30-600 amps from a 42 volts open circuit a.c. supply.

Saturn have also produced four new argon arc welding torches. The heavy duty torch with a water cooled nozzle is rated for use up to 600 amps and the small one up to 300 amps. A new air cooled torch, with a ceramic nozzle, is rated up to 70 amps and a water cooled pencil torch, up to 120 amps. These machines and torches are distributed through their subsidiary company, Rainville Engineering Co. Ltd.

### Range of Valves

Exhibits of the *Saunders Valve Co. Ltd.*, Cwmbran, Mon., include a range of units from the ½ in. valves for laboratory and similar duty to the stainless steel valves used for the control of heavy water in



*H.s.b. diaphragm valve by Saunders Valve Co. for use in acid-laden atmospheres*

UK and Commonwealth atomic reactors. A large cut-open model demonstrates Saunders construction that isolates operating gear from fluid at all times. Both 'A' type (full bore) and 'K' type (straight bore) valves with pressure closing heads are demonstrated under power. Power demonstration by remote control will also include a diaphragm operated pressure opening valve in which automatic closure is provided to close the line in the event of pressure failure. Direct electric operation, typical of the system now offered with Saunders type 'A' valves from ½ in.-12 in., completes the 'live' display.

Automatic control for fluid systems is represented by both pressure opening and pressure closing valves with alternative forms of positioning apparatus. The pressure closing model is exhibited with emergency handwheel, an optional extra available.

Plastics valves for duties in acid laden atmospheres and spherical plug 'M' valves with quick action and straight through, full bore characteristics are also included in the valve display. A new production is the Saunders valve with a closure stop designed to prevent overclosure and to act as a simple visual valve position indicator.

### New Measuring Instrument

New load and torque measuring and recording equipment is being shown for the first time by *Savage and Parsons Ltd.*, Watford, Herts. The equipment has been designed to give a continuous indication



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and direct writing pen record of applied load and/or torque in certain plant and machinery utilising rollers, such as rolling mills, in the chemical industry and in the manufacture of plastics and rubber.

Direct current energised strain gauge bridges are used for both load and torque measurements, and to ensure a continuous indication of each quantity over a protracted period, a drift free system of direct coupled amplification is employed. The output signal from the gauge bridge is broken up by a transistor chopping circuit in the input stage. The amplifier output is rectified and appears as a steady d.c. potential (for a steady loading) which is proportional to the input signal. Response is linear up to 40 c/s and overall feedback is incorporated for gain stability. A cathode follower output stage drives a current amplifier, which acts as an impedance match between amplifier and pen recorder.

Savage and Parsons are also showing a range of lead bricks and remote handling tools for use in the nuclear field.

### Protective Clothing

*Siebe, Gorman and Co. Ltd.*, Chessington, Surrey, are featuring clothing and similar protective devices including respiratory apparatus and a new pressure suit. Chrome leather garments and reflective heat clothing used in certain of the atomic energy



*Vista mask by Siebe, Gorman*

establishments are also shown as is a full range of dust masks, breathing and resuscitation apparatus and protective clothing for chemical workers, etc.

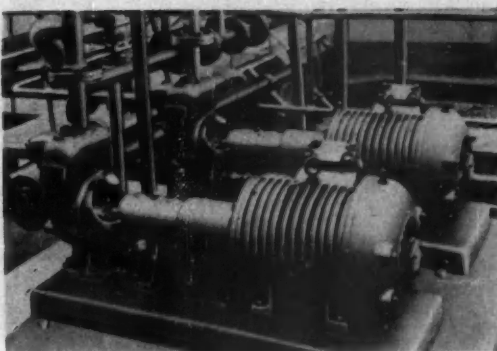
The Vista mask has a Perspex vision window that is acid, oil and petrol resistant. The window is secured to the rubber facepiece by fitting into a channel moulded into the edge of the orifice on the facepiece and clamped in a gas-tight position by two half-clamps and screws.

The mask can be tested for air tightness before entry into toxic atmosphere, can only be worn with harness and life line, with a safety line permanently fixed to harness.

### New Self-Priming Pumps

The exhibit of *Sigmund Pumps Ltd.*, Team Valley, Gateshead 11, introduces a range of single stage self-priming pumps, designed to meet the requirements of industrial applications and processes in branch sizes from 1½ in. up to 8 in. and outputs up to 2,500 gallons per minute. This new Sigmund design is said to offer a

*Type G self-priming pump in a chemical works. Made by Sigmund Pumps Ltd.*



solution to the priming problems associated with centrifugal pumps, obviating pipe layout difficulties arising from the need for positive suction heads and the avoidance of 'humps' in the suction line. In addition, the open type impeller employed in the 'G' self priming pump makes it suitable for handling slurries and similar liquids.

Chemical and refinery process pumps have a prominent place on the stand. Typical units shown are the B-N 18/8/3 stainless steel chemical pump (stripped to show the internal construction and the mechanical seal), the K-N process pump (cut away to show the gland and mechanical seal arrangement), and the HO-N single stage heavy duty process pump.

### Liquid Controllers

*Simmonds Aerocessories Ltd.*, Treforest, Pontypridd, Glam., incorporating Firth Cleveland Instruments Ltd., are demonstrating the Fram filter/separators for hydrocarbon liquids. Also on view are the industrial liquid flowmeter, which is automatically corrected for variations of specific gravity and indicates 'rate of flow'; a liquid level controller, an automatic electrical switch designed to make or break contact as required, when the level of liquid in a tank reaches a pre-determined height; a float-operated instrument suitable for applications where float arm, air or diaphragm-operated gauges are not suitable, e.g. liquified gases, acids, or of fluids in high-pressure or vacuum tanks; hydrostatic gauge, operated by a compressed air source or by hand-pump and providing remote reading of tank contents; and a hydraulic gauge, a float-operated instrument suitable for all types of fluid and for tanks operating under pressure or vacuum.

### Speed Sensitive Switch

Speed sentinel switch, a new development of *Smiths Industrial Instruments Ltd.*, Chronos Works, London NW2, is a speed sensitive switch, the initial purpose of which is overspeed protection, over and under speed protection and starter circuit control. A new calibrated relay has been designed to maintain and control voltage, current and speed as applied to starter and overspeed protection. It is a new approach to the problem of closing a pair of contacts at a given electrical input. The basic principle consists of a permanent magnet and moving coil system, which gives a high efficiency of conversion from electrical energy to

mechanical force. The precision is achieved by a patent magnetic lock which is adjusted to a predetermined value.

### Double Beam Oscilloscope

The Southern double-beam oscilloscope is shown by *Southern Instruments Oscilloscope Division*, Frimley Road, Camberley, Surrey, in completely self-contained form, incorporating built-in stabilised power supplies. The same 20th century flat-faced 6 in. tube is used with two separate gun assemblies, enabling full use to be made of independent beam and plate controls without interaction.

Separate identical Y amplifiers for each beam make possible the direct comparison of waveforms. The gain is variable from 26 to 800 over a bandwidth from d.c. to 100 K.c.p.s. RC coupling can be provided by switch selection and there is a frequency compensated 10:1 input attenuator. Signal calibration is possible on each beam from 0.1 volt to  $\pm 2$  volts ( $\pm 20$  volts with attenuator in).

The calibrated sweep time duration is from 100 microseconds to 1,000 milliseconds with additional twenty times expansion on the X amplifiers. Synchronisation may be internal or external and, in addition, provision is made for operation from contacts on a machine or vibratory device and for beam triggering from the timing contacts on the M731 universal camera.

### 4-Man Air Towel

Exhibits on display at the stand of the *Spiral Tube and Components Co. Ltd.*, Osmaston Park Road, Derby, include Component Series air heaters for air-conditioning and special process plant, unit air heaters for space heating and drying purposes, all electric unit air heaters for industrial use and air coolers for process plant. Another piece of new equipment is the 4-man Air Towel, designed for use in industrial toilets for hand, arm and face drying, also new is a 2-man Air Towel.

### Fine Particle Classifier

Being shown in the UK for the first time by *Sharples Centrifuges Ltd.*, Tower Works, Doman Road, Camberley, Surrey, is the Sharples Super-classifier for the classification of fine particles. The cut point of this classifier is described as exceedingly precise; five fractions with a top size

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On show for the first time in the UK is this super classifier by Sharples Centrifuges

in the range of 15-20 microns will contain less than 0.01 to 0.04 per cent 325 mesh screen residue. Cutpoint sharpness is not affected by throughput rate or size distribution of the feed. Product recovery varies from 80 per cent to well over 90 per cent. Production runs on talc have been made with over 97 per cent yield at a top size cutpoint of about 15 microns. Efficiency is unaffected, it is stated, by changes in throughput rate or size distribution of the feed. High production capacities combined with high quality product can be obtained as feed rates or distribution do not affect cutpoint and efficiency. The classifier operates continuously without adjustment and with the minimum of operator attention. Change over from one cutpoint to another requires only the changing of two vane rings and a drive pulley—which takes less than an hour.

Also new is the Sharples Micromerograph particle size analyser. This provides accurate, rapid, and reproducible particle size distribution analysis. The Micromerograph is an automatically, self recording, sedimentation balance type instrument.

### Exhaust and Cleaning Units

South London Electrical Equipment Co. Ltd., Lamer Works, Hither Green Lane, London SE13, are showing exhaust equipment for the assembly of components liable to give off noxious fumes such as epoxy resins or where harmful bacteria are being evolved. A constant stream of air is drawn from the factory, passes the operator and the work in progress and discharges to the outside of the building. Also on show are glove boxes containing sealed atmospheres which may be accurately controlled to fine limits.

Specially designed for the electronic and instrument industries where ultra pure air, free from lint and similar particles, is required is the small Ultronaire Electronic Air Cleaner. A high degree of efficiency is claimed by virtue of the space voltage incorporated in the unit.

### Spun Iron Pipes

Spun iron pipes of various types are being shown by the Stanton Ironworks Co. Ltd., 4 Norfolk Street, London WC2. Pipes of diameters 2 in. to 27 in. are avail-

able for cast iron water or gas mains. Another Stanton product is the flanged spun iron pipe. This has, it is stated, the advantage of a spun pipe with its lighter weight and improved tensile strength, specially designed cast iron flanges being screwed on to the ends of plain ended pipes or on to one end of pipes cast with an integral flange.

For water supply schemes, Stanton have prestressed concrete pressure pipes in diameters of 27 in. and above in standard lengths of 15 ft.

### Hydraulically Driven Pumps

Pumps exhibited by Stothert and Pitt Ltd., 38 Victoria Street, London SW1, include those for fuel and lubricating oil services, fuel bunkering and for spirit. Outputs range from 700 t.p.h. to 1 t.p.h. Fuel oil units pumping up to 1,000 p.s.i., are also available.

A model of a set of pumps hydraulically driven from a main engine is displayed, also a fuel blending device, coupled to a variable output pump of new design.

### Industrial Lubricants

Inspection samples of Panther and Deso grades of lubricants for oil engines can be obtained at the stand of *Sternol Ltd.*, Royal London House, Finsbury Square, London EC2. Other industrial lubricants and Dectoyl hydraulic oils are exhibited. For heavy industrial gearing, there are the Dectoyl gear lubricants.

For foundries, this company has a range of Sternocore binders which include powders, creams, semi-solids and oils. Particularly of interest to the chemical industry are the anti-dermatitis barrier creams and hand cleansers.

### Tubular Steel Products

A select range of steel tubular products is displayed by *Stewarts and Lloyds, Ltd.*, Brook House, Upper Brook Street, London W1, with associated and subsidiary companies. The accent of the display is on manipulated pipework for both high and low pressures and temperatures, and boiler tubes, both seamless and electric resistance weld.

Also exhibited are heating coils; a wide range of joints and couplings; protective linings and coverings and samples of screwed and socketed steel tubes and fittings.

### Engineering Filters

*Stream-Line Filters Ltd.*, Ingate Place, Queenstown Road, London SW8, are showing a representative range of well established filters for a variety of engineering requirements.

There are in addition filters for dealing with hydraulic oils, cutting oils and other requirements arising in engineering works. A special model for either hatch or continuous filtration has been developed recently for operating at a pressure of 3,000 p.s.i. Equipment showing operating principles and results achieved is being demonstrated.

### Waxtrol Coolant Valve

A new coolant valve—the Waxtrol is exhibited by *Teddington Industrial Equipment Ltd.*, Sunbury-on-Thames, Middlesex. It has been produced to meet a long expressed demand for a reliable thermostatic valve which, while being sufficiently sensitive to maintain the coolant temperature within close limits, will be completely insensitive to pump pressure. Wax-filled elements are embodied in the Waxtrol which has been specially designed for use with the largest diesel engines in stationary plants where the cooling systems normally operate at much higher pressures and the duty is far more severe than in the normal internal combustion engine.

A special wax, which reacts to the operating temperature is sealed in a container in the operating element. Expansion of the wax on a rise in temperature actuates the valve unit by extruding a flexible plug into a reduced diameter in the piston housing thereby overcoming a return spring and moving the valve upwards against a fixed seat.

### Chemical Process Plant

The *John Thompson Group*, Wolverhampton, are exhibiting several aspects of their work such as steam for power and industry, nuclear power and chemical and process plant. Under the first head, various boilers are displayed. In the nuclear power section there is a sectionalised model of a reactor and heat exchangers for Berkeley. Exhibits of chemical process plant indicate techniques used in the fabrication of large welded pressure vessels to Lloyds' class I specification. Illustrated is a 12 in. thick steel ring, 5 ft. 6 in. in diameter, together with test pieces. There are also exhibits related to strip and wire pickling plant and synthetic resin production plant.

### Flaw Detectors

A wide range of products in the field of non-destructive testing is displayed by the *Ultrasonic Co. (London) Ltd.*, Sudbourne Road, Brixton Hill, London SW2. There is a portable automatic rig for the immersed ultrasonic testing of metal forgings, castings, etc. The unit comprises an immersion scanning test unit coupled to a two-level defect monitor and a recording device which produces a permanent record of defect size and position. The unit is in production with a number of versions already in service in industry. The latest improved Ultrasonoscope flaw detector will be shown, together with a new and improved range of search probes. Unique features include curved crystal probes for testing round sections, point probes for weld testing and miniature probes with 4 mm. crystals for small parts such as turbine blades, etc.

### Stainless Steel Tubes

Tubes and associated products for nuclear energy production are exhibited by *Talbot Stead Tube Co. Ltd.*, Green Lane, Walsall. These include charging standpipes, flanges in stainless steel, stainless steel tubes and carbon steel tubes.



● **MR. G. C. BARNARD**, director, industrial alcohol division of the Distillers Co. Ltd., left Southampton for Canada in the Cunard liner *Ivernia* on Wednesday, 28 August. He was accompanied by Mrs. Barnard.

● **DR. R. G. BATES** has been appointed chief of the physical chemistry section of the US National Bureau of Standards, succeeding Dr. E. R. Smith, who retired recently. Dr. Bates, an internationally-known authority on pH measurement, has been a member of the Bureau staff since 1939. In 1953 he was awarded a fellowship by the US Public Health Service which enabled him to spend the academic year 1953-54 on research at the Chemisches Institut der Universität in Zurich. Since 1953, Dr. Bates has been chairman of the commission of electro-chemical data, International Union of Pure and Applied Chemistry.

● **MR. T. N. REID**, who has been appointed manager of the fertiliser product group of Shell Chemical Co., will have as his first job the development of a marketing organisation for the nitrogenous fertilisers which will be available from the plant at Shellhaven at the end of 1958.



T. N. Reid

Mr. Reid joined Shell in 1946 and after working as an agricultural representative in Kent and Sussex, he joined head office as agricultural sales manager to Mr. H. G. Huckle. During this time he spent six weeks in Ceylon carrying out a survey on petrochemicals for the Shell group. In early 1953, Mr. Reid was transferred for three years to the Shell Co. of Turkey, where he was responsible for setting up a marketing organisation for petrochemicals.

Following Mr. Reid's recent appointment, the agricultural division will be divided into two departments: fertilisers under Mr. Reid, and general agricultural chemicals under Mr. R. R. CHIPPINDALE. Both will be responsible to Mr. C. HUDDART as sales manager of the division under Mr. H. G. HUCKLE, agricultural marketing manager.

● **DR. NICHOLAS KURTI**, of Oxford, is the first recipient of the Fritz London Award, given biennially for distinguished research in low temperature physics and chemistry as a memorial to Fritz London, outstanding low temperature scientist and professor at Duke University. Arthur D. Little Inc., of Cambridge, Mass., US, sponsored the tribute this year and will sponsor the award again in 1959. Dr. Kurti received the award, in the form of a cheque for \$1,000, at the fifth international conference on low temperature physics and chemistry, which was held last week at Wisconsin University. Dr. Kurti has done outstanding work at Oxford University for many years as a senior member of the Clarendon Physical Laboratory. He was one of the first to apply the technique of adiabatic demagnetisation for obtaining temperatures below 1° Kelvin. More recently his work

## PEOPLE in the news

has been in the field of nuclear orientation and nuclear cooling, which has led to techniques for obtaining temperatures in the region of a few micro-degrees Kelvin by adiabatic demagnetisation of nuclear spins.

● **MR. NEVILLE JOY**, a qualified plant pathologist, has joined the horticultural section of the commercial development department of Pfizer Ltd., Folkestone. He took a B.Sc. degree in agricultural botany at Reading University. After leaving Reading he was awarded a diploma in agricultural science at Cambridge and a diploma of tropical agriculture at the Imperial College of Tropical Agriculture, Trinidad. Mr. Joy, who spent 3½ years as a plant pathologist in the Department of Agriculture, Tanganyika, before taking up his new appointment, will conduct trials of antibiotics and other new horticultural products from Pfizer's Folkestone headquarters.

● **PROFESSOR P. M. S. BLACKETT**, FRS, the president of the British Association for the Advancement of Science, who is presiding over the Association's meeting in Dublin which began on 4 September, is professor of physics, Imperial College of Science and Technology. Born in 1897, Professor Blackett was educated at the Royal Naval Colleges, Osborne and Dartmouth, and at Magdalene College, Cambridge. He was professor of physics at Birkbeck College from 1933-37, and at Manchester University from 1937-53. During World War II, he directed naval research at the Admiralty. In 1933 he was elected FRS, and in 1940 was awarded the Royal Society's Royal Medal. Professor Blackett was awarded the Nobel Prize for Physics in 1948 for his improvement of the Wilson cloud-chamber method, and for the resulting discoveries in the field of nuclear physics and cosmic rays.

● The Gas Council's 1957 research scholarships to students who have recently graduated in physics, chemistry or engineering have been awarded as follows: Mr. A. RICHMOND, B.A.(Oxon.), department of inorganic and physical chemistry, Oxford University (the mechanism of gaseous oxidation processes); Mr. K. J. REID, B.Sc., department of chemical engineering, Cambridge University (chemical engineering fundamentals); Mr. P.

HAWTIN, B.Sc.(Eng.), department of chemical engineering, University College, London (heat transfer with a special interest in heat transfer to gases); Mr. D. WILSON, B.Sc., department of chemical engineering, Birmingham University (gas absorption); Mr. J. N. SHERWOOD, B.Sc., A.R.I.C., department of chemistry, Glasgow University (diffusion studies in molecular crystals).

● **SIR LEONARD OWEN** has succeeded Sir Christopher Hinton as managing director of the Industrial Group of the UK Atomic Energy Authority, as forecast in our issue of 10 August. This follows the appointment of Sir Christopher Hinton as chairman of the newly formed Central Electricity Generating Board.



Sir Leonard, who is 60, was knighted in the 1957 New Year Honours. He has been engaged in the development of Britain's atomic energy programme since 1946 when he was appointed director of engineering by the Minister of Supply. The following year he became assistant controller in the Atomic Energy Division's production side, and in 1954, when the Atomic Energy Authority was formed, he was appointed director of engineering and deputy managing director. During the war he was director of the Royal Filling Factories.

● **SIR JAMES CHADWICK**, Master of Gonville and Caius College, Cambridge since 1948, has been appointed a part-time member of the UK Atomic Energy Authority in succession to the late Lord Cherwell. He was author, in 1930, of 'Radiations from Radioactive Substances' (with Lord Rutherford and C. D. Ellis).

### Safety Trophy for ICI Lime

ICI inter-division safety trophy for the year ended 30 June was won by the lime division. During the period the division secured a reduction of 28.45 per cent over their previous best figure. Billingham division was second with a 24.575 per cent reduction. The company figure for the year was an improvement of 8.541 per cent compared with the previous best.

### Obituary

**MR. WILLIAM HAROLD PALMER**, former works manager of the ICI Gaskell-Marsh Works, Widnes, died suddenly a few days ago aged 63. Mr. Palmer, who had retired to Devon, started work on the nitric acid plant of Chance and Hunt, Oldbury, in 1915. He was technical assistant to the general manager when he left in 1932 to become senior plant manager at the Gaskell-Marsh Works, Widnes. He became deputy works manager in 1936 and works manager four years later. Mr. Palmer had completed 40 years service with ICI and its predecessor companies when he retired two years ago.

# UK Chemical Exports and Imports for January-July 1957

## EXPORTS

		QUANTITY		VALUE	
		Jan./July 1956	Jan./July 1957	Jan./July 1956	Jan./July 1957
<b>INORGANIC</b>					
Acids	Cwt.	110,162	124,039	£ 383,067	£ 401,452
Copper sulphate	Tons	29,971	24,820	3,256,925	2,181,533
Sodium hydroxide	Cwt.	3,234,127	2,972,594	3,986,885	3,696,669
Sodium carbonate	"	2,880,831	2,889,075	1,799,509	1,972,304
Aluminium oxide	Tons	12,959	19,269	418,304	655,584
Aluminium sulphate	"	24,493	19,114	350,116	267,353
Other aluminium cpds.	"	1,979	2,383	80,559	93,403
Ammonia	Cwt.	59,583	56,389	219,544	191,288
Ammonium cpds. (not ferti- lisers or bromides)	Tons	14,488	11,467	555,932	439,093
Arsenical compounds	"	2,506	2,673	192,002	187,708
Bismuth compounds	Lb.	182,320	203,603	156,930	170,722
Bleaching powder	Cwt.	228,395	143,740	369,050	253,388
Hydrosulphite	"	37,291	59,836	298,445	469,798
Other bleaching materials	"	57,193	78,319	240,891	370,678
Calcium compounds	"	191,913	205,679	396,580	412,435
Carbon blacks	"	236,209	428,266	822,036	1,538,474
Cobalt compounds	"	7,856	8,971	364,662	326,408
Iron oxides (chemically manu- factured)	"	54,262	57,823	180,194	175,560
Lead compounds	"	26,816	28,516	180,862	180,567
Magnesium cpds. (nes)	Tons	7,781	9,986	409,630	497,603
Nickel salts	Cwt.	43,298	52,018	421,780	572,645
Potassium cpds. (not ferti- lisers and bromides)	"	31,009	33,199	305,381	351,209
Sodium bicarbonate	"	424,786	428,253	379,813	393,318
Sodium phosphates	"	40,797	73,697	197,618	345,342
Sodium silicate	"	243,929	190,766	211,768	172,770
Other sodium cpds.	"	995,461	943,854	2,169,310	2,249,940
Tin oxide	"	3,821	5,693	142,462	208,203
Zinc oxide	Tons	3,110	3,692	253,149	268,150
Inorganic chemicals (nes)	"	—	—	2,850,697	2,853,298
<b>ORGANIC</b>					
Acids, anhydrides and their salts and esters	Cwt.	38,080	63,832	797,470	751,291
Glycerine	"	—	—	420,675	590,078
Ethyl alcohol, etc., & mix- tures of alcohols (nes)	"	—	—	740,481	899,494
Acetone	Cwt.	104,649	81,113	257,308	257,290
Citric acid	"	20,536	31,283	201,917	303,352
Gases, compressed, liquid or solid (nes)	"	—	—	592,468	1,255,809
Phenol	Cwt.	53,513	76,429	334,919	498,354
Salicylates	Lb.	478,937	708,796	131,331	211,679
Sodium compounds	Cwt.	16,603	19,112	183,901	241,129
Sulphonamides not prepared by dyestuffs intermediates (nes)	Lb.	974,655	832,637	510,229	567,677
Dyestuffs intermediates (nes)	Cwt.	49,531	60,966	853,140	895,606
Organic chemicals (nes)	"	—	—	7,848,782	9,914,406
<b>Total for elements &amp; cpds.</b>		—	—	<b>34,526,722</b>	<b>38,285,584</b>
Coal tar	Tons	79,078	56,900	704,838	597,098
Cresylic acid	Gall.	2,108,108	2,013,149	668,815	725,686
Benzol	"	671,830	15,775	123,238	6,660
Croosote oil	"	11,486,464	10,481,276	749,831	724,621
Other mineral tar & crude chemicals	"	—	—	2,643,462	2,328,215
Pigment dyestuffs	Cwt.	14,289	16,568	601,398	671,416
Other synthetic dyestuffs	"	109,120	117,821	4,928,570	5,568,787
Synthetic organic pigments	"	13,296	15,246	482,713	602,500
Vegetable and animal dyeing extracts	"	2,351	2,276	77,380	70,208
Tanning extracts	"	64,521	83,912	289,599	378,130
Synthetic tanning materials	"	42,105	47,665	147,234	182,054
Pigments, paints & varnishes	"	—	—	13,711,645	14,272,133
Drugs, medicines, etc.	"	—	—	20,743,297	23,398,168
Explosives	"	—	—	6,619,813	6,381,260
Insecticides, fungicides & rodenticides	Cwt.	231,509	218,595	2,665,226	2,748,285
Weedkillers	"	59,034	68,525	701,273	727,088
Carbons, decolorising or ac- tivated	"	49,449	47,110	211,445	197,278
Tetra-ethyl lead anti-knock compound	Gall.	2,768,200	3,257,672	5,888,597	7,105,070
<b>FERTILISERS</b>					
Ammonium nitrate	Tons	2,851	1,696	91,286	55,677
Ammonium sulphate	"	18,355	58,576	355,661	1,038,069
Phosphatic and potassic	"	—	—	43,965	39,478
Other fertilisers	"	—	—	243,619	245,882
<b>PLASTICS MATERIALS</b>					
Phenol & cresol formalde- hyde resins	Cwt.	33,360	40,527	247,572	276,873
Urea formaldehyde resins	"	156,077	138,811	746,901	694,993
Vinyl resins, unplasticised	"	87,391	123,615	876,020	1,077,330
Vinyl resins, plasticised	"	64,758	48,277	851,406	836,444
Other vinyl resins	"	106,685	127,507	1,343,600	1,654,782
Moulding materials	"	425,594	559,395	5,392,080	7,257,109
Sheet, rod, tube, film & foil	"	164,375	175,727	5,023,682	5,154,042

## IMPORTS

		QUANTITY		VALUE	
		Jan./July 1956	Jan./July 1957	Jan./July 1956	Jan./July 1957
<b>INORGANIC</b>					
Acids	Cwt.	39,659	43,626	£ 115,480	£ 132,356
Aluminium oxide—					
Crude, unground	Tons	14,619	9,688	758,314	528,725
Ground or graded	"	2,187	1,782	234,777	193,963
Silicon carbide	"	8,334	5,211	839,317	521,317
Arsenic trioxide	"	3,772	2,654	131,593	77,793
Borax, refined	Cwt.	265,824	294,134	503,829	586,202
Calcium carbide	"	566,575	656,949	1,055,773	1,248,429
Carbon black channel	"	103,655	107,590	588,289	621,372
Other carbon blacks	"	57,195	42,205	220,854	161,760
Cobalt oxides	"	7,701	4,591	481,771	287,125
Iodine	Lb.	289,933	685,707	145,826	264,087
Mercury	"	1,166,726	1,001,079	1,277,026	1,090,455
Sodium, calcium, potassium, lithium	Cwt.	41,626	20,716	588,888	168,920
Potassium carbonate	"	54,622	61,399	176,925	201,240
Other potassium cpds. (not fertilisers)	"	43,224	63,440	204,962	287,446
Selenium	Lb.	117,980	94,809	675,030	485,317
Silicon	Tons	4,061	3,109	602,288	502,788
Sodium chlorate	Cwt.	69,461	79,268	212,483	262,207
Sodium phosphate	"	16,866	2,588	77,628	16,098
Other sodium cpds.	"	193,016	207,400	772,759	734,501
Inorganic chemicals (nes)	"	—	—	£ 1,613,158	£ 1,843,840
<b>ORGANIC &amp; OTHERS</b>					
Acids, anhydrides & their salts & esters	Cwt.	77,538	83,973	£ 1,102,030	£ 1,434,954
Glycerine	"	52,154	112,178	598,201	517,696
Menthol	Lb.	—	—	105,868	235,596
Naphthols, methyl alcohol & alcohols & alcohol mix- tures (nes)	"	—	—	£ 1,463,541	£ 1,900,408
Turpentine	Gall.	224,271	167,424	60,745	46,453
Glycol ethers & esters	Lb.	4,778,164	3,460,519	399,023	338,507
Sodium cpds.	Cwt.	71,080	86,009	710,912	893,485
Styrene (monomeric)	Gall.	1,891,539	396,987	1,043,386	211,527
Vinyl acetate (monomeric)	Tons	5,657	3,073	828,422	358,275
Dyestuffs intermediates	Cwt.	4,697	18,160	286,904	587,126
Organic cpds. (nes)	"	—	—	7,988,380	6,849,291
Synthetic organic dyestuffs & cpds.	"	530,843	640,055	3,620,457	3,975,778
Sulphur	Cwt.	215,277	193,377	3,280,111	3,044,531
Mineral phosphates of lime	"	765,001	700,410	5,542,937	5,537,688
Bonemeal	Tons	6,059	6,152	142,344	144,705
Sodium nitrate, natural	"	14,707	14,919	316,448	322,842
Vitamins	"	—	—	910,927	627,733
Antibiotics	"	—	—	415,979	633,601
Alkaloids	"	—	—	579,607	379,805
Basic slag	Tons	42,995	52,969	340,077	431,493
Potassium chloride	Cwt.	6,810,259	5,933,366	5,550,144	4,984,834
Potassium sulphate	"	152,205	174,238	153,677	174,980
Other fertilisers	"	—	—	£ 1,051,357	£ 1,176,941
<b>PLASTICS MATERIALS</b>					
Vinyl resins	Cwt.	73,208	95,279	£ 1,066,824	£ 1,260,492
Other synthetic resins	"	102,469	152,087	1,485,052	2,096,918
Polystyrene	"	2,687	6,387	34,161	84,839
Other moulding powders	"	16,496	26,099	296,773	431,323
Sheet, rod, tube, film & foil	"	268,054	362,361	6,350,322	7,567,651

## EXPORTS OF CHEMICALS TO PRINCIPAL MARKETS

	Jan./July 1955	Jan./July 1956	Jan./July 1957
Gold Coast	2,172,418	2,444,089	3,092,018
Nigeria	2,720,594	3,253,255	2,930,378
Union of South Africa	6,645,125	7,390,159	7,336,457
Rhodesia and Nyasaland	1,167,960	1,385,550	1,701,683
India	8,457,836	11,156,900	11,784,213
Pakistan	2,432,636	2,313,187	1,903,574
Singapore	2,121,006	2,604,697	2,567,905
Federation of Malaya	1,757,448	2,155,292	2,320,378
Ceylon	1,440,443	1,325,590	1,935,009
Hong Kong	1,863,452	2,086,198	2,773,170
Australia	10,457,092	10,761,646	12,482,491
New Zealand	4,281,447	4,233,817	4,806,537
Canada	3,915,817	4,573,227	4,800,791
Irish Republic	4,076,550	4,105,885	3,874,142
Sweden	3,506,365	4,637,199	4,328,814
Norway	2,068,403	2,091,630	2,439,840
Denmark	2,299,144	2,526,401	2,797,951
Western Germany	3,184,398	3,553,245	4,710,217
Netherlands	4,369,343	5,313,720	5,530,339
Belgium	3,028,257	3,315,906	4,099,016
France	4,300,572	4,146,553	5,925,441
Switzerland	1,592,005	1,789,511	2,040,591
Italy	3,652,604	4,637,599	5,481,625
Netherlands Antilles	1,807,388	1,524,222	2,007,389
Iran	1,164,400	1,452,288	1,766,982
Burma	665,699	1,196,576	2,023,458
Indonesia	1,340,268	1,436,913	2,732,230
China	1,989,067	1,666,664	1,721,224
United States of America	1,245,319	3,32,072	1,632,065
Brazil	4,373,861	5,131,437	4,464,544
Argentina Republic	176,603	985,166	1,658,569
	3,231,044	1,832,593	3,066,725
<b>Total for all Countries</b>			
	129,078,280	141,896,451	159,241,449



## Commercial News

## Closing of Size Business Hits Amber Chemical

**R**ESULTS of Amber Chemical Industries have been adversely affected by discontinuance of the size business. Group net loss for 1956 was £34,102 compared with a previous net profit of £7,154. A trading profit of some £7,750 is recorded, however, for the six months to 30 June last. This profit does not take into account expenditure on Cubitt Town Wharf, research, publicity and development.

All things being equal, an improvement on the first six months is hoped for in the current half-year. In the meantime the directors state they are not in a position to consider making payments on any preference dividend arrears until seeing the results for the whole of 1957.

### Benn Brothers

Net profit of Benn Brothers Ltd., proprietors of CHEMICAL AGE, for the year ended 30 June was £67,579 (£34,806). As already announced a final dividend of 10 per cent, making 15 per cent (same) has been declared on ordinary.

In his annual statement Mr. E. G. Benn, chairman, said that the result of the year's trading was about £10,000 better than 12 months ago if the £23,000 loss of profit due to the printing stoppage in the spring of 1956 was added back to the 1955/56 figures. During the year the company had to compete with the largest single increase in printing charges since the war, higher wages and higher overheads.

In the full year, advertising revenue was more than £100,000 up and Mr. Benn pointed out that a year ago the company had joined the Audit Bureau of Circulations. That increase was clear evidence of the value of their journals' advertisement columns to the trades and industries they served. The advertisement revenue showed the great extent to which the firms concerned with the supply of chemicals, electricity, gas, hardware, furnishings, timber, leather and food growing—to mention some of the industries covered—knew the benefits to be obtained from the company's advertisement columns.

In October 1956, Benn Brothers threw off the last of the war-time restrictions when CHEMICAL AGE returned to its normal size and so at last, 12 years after the end of the second world war, 'we have had a nearly complete financial year with all our journals back at full size and in full vigour.'

### Unilever Ltd.

Estimated combined profits for the first half-year of Unilever Ltd. and Unilever N.V., are £3 million down at £19.4 million compared with the corresponding 1956 period. Of these profits, Unilever Ltd. contributed £10.9 million and N.V. £8.5 million.

The previous half-year profit (to 31 December last) was £24.7 million. Turn-

over for the first half of this year was £846 million compared with £813 million in the same period in 1956, and £858 million for the six months to last December.

Though separate turnover figures are not given, N.V. profits at £21.3 million against £27.2 million and £24.5 million in the two halves of 1956 show a more severe fall compared with Unilever Ltd.'s £22.4 million against £23.4 million and £23.6 million.

No comment has been made by the company on the drop in group profits.

### Cuming Smith and Co.

Holding company for chemical and fertiliser interests, Cuming Smith and Co., is paying an interim dividend of 4 per cent, of which 1 per cent is tax free and is payable 19 September. Indications are that the income for 1957 will be similar to that of 1956.

### Major and Co.

Chemical manufacturers, tar distillers, etc., Major and Co. Ltd., declare a final dividend for the year ended 31 March 1957 of 7½ per cent (same) making a total dividend of 12½ per cent (same) for the year. Consolidated profit after tax is £38,072 (£33,781), less a minority interest of £7,159 (£8,525).

### Murex Ltd.

Outlook for the metallurgical company, Murex Ltd., is described as 'most encouraging' by chairman, Sir Arthur Smout. Group net profits in the year ended 30 April last dropped from £579,289 to £351,709. These were adversely affected by the continuous decline in the world price of wolfram which resulted in heavy losses on turnover of stocks, accentuated by a falling off in the demand for tungsten products.

## Market Reports

### DEMAND IS MORE ACTIVE

**LONDON** The demand for industrial chemicals on home account has been more active than in recent weeks and contract deliveries are being taken up in fair quantities. Enquiry for shipment continues at a good level chiefly for Commonwealth destinations. Hydrogen peroxide is finding a ready outlet and there is a good call for borax and boric acid. Prices for the most part are firm at recent levels with the chromium compounds moving with the advance in quotations.

The call for the xylois and cresylic acid remains good on a steady coal tar products market.

**MANCHESTER** Most industrial users of heavy chemicals in Lancashire and the north-west, including most sections of the textile trades, are calling for steady deliveries under contracts and new enquiries from

Trading results were otherwise satisfactory.

With regard to the development of the less common metals—zirconium, molybdenum, tantalum and beryllium—the chairman sounded a warning stating that this must be influenced by factors beyond the company's control and that it might well be some years before they made an important contribution to the company's prosperity.

The chairman said that plans were now in hand for the erection at Rainham of a new plant for the production of pure tantalum and niobium powders. This plant was scheduled to come into production in 1959, and should be able to meet foreseeable user requirements for these products, current demands being satisfied by the output from the existing pilot plant. Demand for tantalum, though small, was stated to be growing, particularly in the electronics field and for use in chemical engineering. Niobium, besides being of interest in the field of nuclear energy, had possibilities for engine components. The company's pilot plant for zirconium had been expanded and the whole of the output was being sold in this country. Although detailed design work for a new large-scale plant has been completed, pending clarification of probable demand and availability of world supplies, no decision had yet been taken for the construction of a new plant. Murex's interest in beryllium was confined, at present, to the management of the UK AEA agency factory.

A high purity molybdenic oxide plant and a substituted extension to the tungsten carbide department were now nearing completion. Projects in hand include a new tantalum/niobium plant, and an extension to the main analytical laboratory.

### Vitamins Group

Group profit after tax of the Vitamins Ltd. for the year ended 31 March was £90,409 (£106,169). A dividend of 17½ per cent (15 per cent) is proposed on ordinary. In his annual statement, Mr. H. C. H. Graves, chairman, said that the company's main products, vitamins, were cheaper than ever before. This was brought about by increased efficiency and productivity in virtually all departments.

the home and export trades are circulating fairly freely. Firm price conditions are again reported, any uncertainty being still in respect of the non-ferrous metal products. A satisfactory movement of fertilisers continues, and a steady outlet is being found for most of the light and heavy tar products.

**GLASGOW** Considerable improvement in the Scottish heavy chemical market occurred during the past week. There has been a varied demand from most sections of the industry in regard to current demands and forward deliveries.

Although for the most part prices have remained fairly steady, some increases have been reported. A rather quiet position prevails on the agricultural side, while the overseas market continues to be fairly active.

# UK Chemical Exports and Imports for January-July 1957

## EXPORTS

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Aluminium oxide	Tons	12,959	19,269	418,304	655,584
Aluminium sulphate	"	24,493	19,114	350,116	267,353
Other aluminium cpds.	"	1,979	2,383	80,559	93,403
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Bismuth compounds	Lb.	182,320	203,603	156,930	170,722
Bleaching powder	Cwt.	228,395	143,740	369,050	253,838
Hydrosulphite	"	37,291	59,836	298,445	469,798
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Inorganic chemicals (nes)	"	—	—	2,850,697	2,853,298
<b>ORGANIC</b>					
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Ethyl alcohol, etc., & mixtures of alcohols (nes)	"	—	—	740,481	899,494
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Phenol	Cwt.	53,513	76,429	334,919	498,354
Salicylates	Lb.	478,937	708,796	131,331	211,679
Sodium compounds	Lb.	16,603	19,112	183,901	241,129
Sulphonamides not prepared	Lb.	974,635	832,637	510,229	567,677
Dyesulf intermediates (nes)	Cwt.	49,531	60,966	853,140	895,600
Organic compounds (nes)	"	—	—	7,848,782	9,914,406
Total for elements & cpds.		—	—	34,524,722	38,285,504
Coal tar	Tons	79,078	56,900	704,838	597,098
Cresylic acid	Gall.	2,108,108	2,013,149	668,815	725,686
Benzol	"	671,830	15,775	123,238	6,660
Cresosote oil	"	11,488,664	10,481,276	749,831	724,621
Other mineral tar & crude chemicals	"	—	—	2,643,462	2,328,215
Pigment dyesulf	Cwt.	14,289	16,568	601,390	671,416
Other synthetic dyesulf	"	109,120	117,821	4,928,570	5,568,787
Synthetic organic pigments	"	13,296	15,246	482,713	602,500
Vegetable and animal dyeing extracts	"	2,351	2,276	77,380	70,208
Tanning extracts	"	64,521	83,912	289,599	378,130
Synthetic tanning materials	"	42,105	47,665	147,234	182,054
Pigments, paints & varnishes	"	—	—	13,711,645	14,272,133
Drugs, medicines, etc.	"	—	—	20,745,297	23,398,168
Explosives	"	—	—	6,619,813	6,381,260
Insecticides, fungicides & rodenticides	Cwt.	231,509	218,395	2,665,226	2,748,285
Weedkillers	"	59,034	68,525	701,273	727,088
Carbons, decolorising or activated	"	49,449	47,110	211,445	197,278
Tetra-ethyl lead anti-knock compound	Gall.	2,768,200	3,257,672	5,888,597	7,105,070
<b>FERTILISERS</b>					
Ammonium nitrate	Tons	2,851	1,696	91,286	55,677
Ammonium sulphate	"	18,355	58,576	355,641	1,038,069
Phosphatic and potassic	"	—	—	43,965	39,478
Other fertilisers	"	—	—	243,619	245,882
<b>PLASTICS MATERIALS</b>					
Phenol & cresol formaldehyde resins	Cwt.	33,360	40,527	247,572	276,873
Urea formaldehyde resins	"	136,077	138,811	746,901	694,993
Vinyl resins, unplasticised	"	87,391	123,615	876,020	1,077,930
Vinyl resins, plasticised	"	64,758	68,277	851,406	836,444
Other vinyl resins	"	106,685	127,507	1,343,600	1,654,782
Moulding materials	"	425,594	539,395	5,392,080	7,257,109
Sheet, rod, tube, film & foil	"	164,375	175,727	5,023,682	5,154,042

## IMPORTS

		QUANTITY		VALUE	
		Jan./July 1956	Jan./July 1957	Jan./July 1956	Jan./July 1957
<b>INORGANIC</b>					
Acids	Cwt.	39,659	43,626	£ 115,480	£ 132,356
Aluminium oxide—					
Crude, unground	Tons	14,619	9,688	758,314	528,725
Ground or graded	"	2,187	1,782	234,777	193,963
Silicon carbide	"	8,334	5,211	839,317	521,317
Arsenic trioxide	"	3,772	2,654	131,593	77,793
Borax, refined	Cwt.	265,824	294,134	503,829	586,202
Calcium carbide	"	566,575	656,949	1,055,773	1,248,429
Carbon black channel	"	103,655	107,590	588,289	621,372
Other carbon blacks	"	57,195	42,205	220,854	161,760
Cobalt oxides	"	7,701	4,591	481,771	287,125
Iodine	Lb.	289,933	685,707	145,826	264,087
Mercury	"	1,166,726	1,001,079	1,277,026	1,090,455
Sodium, calcium, potassium, lithium	Cwt.	41,626	20,716	588,888	168,920
Potassium carbonate	"	54,622	61,399	176,925	201,240
Other potassium cpds. (not fertilisers)	"	43,224	63,440	204,962	287,446
Selenium	Lb.	117,980	94,809	675,030	485,317
Silicon	Tons	4,061	3,109	602,288	502,788
Sodium chlorate	Cwt.	49,661	79,268	212,483	268,207
Sodium phosphate	"	16,866	2,588	77,628	16,096
Other sodium cpds.	"	193,016	207,400	772,759	734,561
Inorganic chemicals (nes)	"	—	—	1,613,158	1,843,840
<b>ORGANIC &amp; OTHERS</b>					
Acids, anhydrides & their salts & esters	"	—	—	1,102,030	1,434,954
Glycerine	Cwt.	77,938	83,973	598,201	517,696
Menthol	Lb.	52,154	112,178	105,868	235,596
Naphtha, methyl alcohol & alcohols & alcohol mixtures (nes)	"	—	—	1,463,541	1,900,408
Turpentine	Gall.	224,271	167,424	60,745	46,453
Glycol ethers & esters	Lb.	4,778,164	3,460,519	399,023	330,507
Sodium cpds.	Cwt.	71,080	86,009	710,912	893,485
Styrene (monomeric)	Gall.	1,891,539	396,987	1,043,386	211,527
Vinyl acetate (monomeric)	Tons	5,657	3,073	828,422	358,275
Dyesulf intermediates	Cwt.	4,697	18,160	286,904	587,126
Organic cpds. (nes)	"	—	—	7,980,380	6,849,291
Synthetic organic dyesulf & cpds.	"	530,843	640,055	3,620,457	3,975,778
Sulphur	Cwt.	215,277	193,377	3,280,111	3,044,531
Mineral phosphates of lime	"	765,001	700,410	5,542,937	5,537,688
Bonemal	Tons	6,059	6,152	142,344	144,705
Sodium nitrate, natural	"	14,707	14,919	316,446	322,942
Vitamins	"	—	—	910,937	627,733
Antibiotics	"	—	—	415,979	633,601
Alkaloids	"	—	—	579,607	379,805
Basic slag	Tons	42,995	52,969	340,077	431,493
Potassium chloride	Cwt.	6,810,259	5,933,366	5,550,144	4,984,834
Potassium sulphate	"	152,205	174,238	153,677	174,980
Other fertilisers	"	—	—	1,051,357	1,176,941
<b>PLASTICS MATERIALS</b>					
Vinyl resins	Cwt.	73,208	95,279	1,066,824	1,260,492
Other synthetic resins	"	102,469	152,087	1,485,052	2,096,918
Polystyrene	"	2,687	6,387	34,161	84,839
Other moulding powders	"	16,496	26,099	296,773	431,323
Sheet, rod, tube, film & foil	"	268,054	362,361	6,350,322	7,567,651

## EXPORTS OF CHEMICALS TO PRINCIPAL MARKETS

	Jan./July 1955	Jan./July 1956	Jan./July 1957
Gold Coast	2,172,418	2,444,089	3,092,018
Nigeria	2,720,594	3,253,255	2,930,378
Union of South Africa	6,645,125	7,390,159	7,336,457
Rhodesia and Nyasaland	1,167,960	1,385,550	1,701,683
India	8,457,836	11,156,900	11,784,213
Pakistan	2,432,636	2,313,187	3,044,574
Singapore	2,121,006	2,604,697	2,567,905
Federation of Malaya	1,757,448	2,155,292	2,520,378
Ceylon	1,440,643	1,325,590	1,935,009
Hong Kong	1,863,452	2,086,198	2,773,170
Australia	10,457,092	10,761,646	12,482,491
New Zealand	4,281,447	4,233,817	4,806,537
Canada	3,915,817	4,573,227	4,800,791
Irish Republic	4,076,550	4,105,885	3,874,142
Sweden	3,506,365	3,682,199	4,328,814
Norway	2,068,403	2,091,630	2,439,840
Denmark	2,299,144	2,326,401	2,797,951
Western Germany	3,184,398	3,553,245	4,710,217
Netherlands	4,369,343	5,313,720	5,530,339
Belgium	3,028,257	3,315,906	4,099,016
France	4,300,572	4,146,553	5,925,441
Switzerland	1,592,005	1,789,511	2,040,591
Italy	3,652,604	4,837,599	5,481,605
Netherlands Antilles	1,807,389	1,524,222	2,007,389
Iraq	1,164,400	1,452,288	1,766,982
Burma	665,699	1,196,576	2,023,458
Indonesia	1,340,268	1,436,913	2,732,230
China	1,989,067	1,666,664	1,721,224
United States of America	1,245,319	3,32,072	1,632,065
Brazil	4,373,861	5,131,437	4,464,544
Argentina Republic	176,603	985,166	1,658,569
	3,231,044	1,832,593	3,066,725
<b>Total for all Countries</b>	<b>129,078,250</b>	<b>141,896,481</b>	<b>159,241,469</b>



## Commercial News

## Closing of Size Business Hits Amber Chemical

**R**ESULTS of Amber Chemical Industries have been adversely affected by discontinuance of the size business. Group net loss for 1956 was £34,102 compared with a previous net profit of £7,154. A trading profit of some £7,750 is recorded, however, for the six months to 30 June last. This profit does not take into account expenditure on Cubitt Town Wharf, research, publicity and development.

All things being equal, an improvement on the first six months is hoped for in the current half-year. In the meantime the directors state they are not in a position to consider making payments on any preference dividend arrears until seeing the results for the whole of 1957.

### Benn Brothers

Net profit of Benn Brothers Ltd., proprietors of CHEMICAL AGE, for the year ended 30 June was £67,579 (£34,806). As already announced a final dividend of 10 per cent, making 15 per cent (same) has been declared on ordinary.

In his annual statement Mr. E. G. Benn, chairman, said that the result of the year's trading was about £10,000 better than 12 months ago if the £23,000 loss of profit due to the printing stoppage in the spring of 1956 was added back to the 1955/56 figures. During the year the company had to compete with the largest single increase in printing charges since the war, higher wages and higher overheads.

In the full year, advertising revenue was more than £100,000 up and Mr. Benn pointed out that a year ago the company had joined the Audit Bureau of Circulations. That increase was clear evidence of the value of their journals' advertisement columns to the trades and industries they served. The advertisement revenue showed the great extent to which the firms concerned with the supply of chemicals, electricity, gas, hardware, furnishings, timber, leather and food growing—to mention some of the industries covered—knew the benefits to be obtained from the company's advertisement columns.

In October 1956, Benn Brothers threw off the last of the war-time restrictions when CHEMICAL AGE returned to its normal size and so at last, 12 years after the end of the second world war, 'we have had a nearly complete financial year with all our journals back at full size and in full vigour.'

### Unilever Ltd.

Estimated combined profits for the first half-year of Unilever Ltd. and Unilever N.V., are £3 million down at £19.4 million compared with the corresponding 1956 period. Of these profits, Unilever Ltd. contributed £10.9 million and N.V. £8.5 million.

The previous half-year profit (to 31 December last) was £24.7 million. Turn-

over for the first half of this year was £846 million compared with £813 million in the same period in 1956, and £858 million for the six months to last December.

Though separate turnover figures are not given, N.V. profits at £21.3 million against £27.2 million and £24.5 million in the two halves of 1956 show a more severe fall compared with Unilever Ltd.'s £22.4 million against £23.4 million and £23.6 million.

No comment has been made by the company on the drop in group profits.

### Cuming Smith and Co.

Holding company for chemical and fertiliser interests, Cuming Smith and Co., is paying an interim dividend of 4 per cent, of which 1 per cent is tax free and is payable 19 September. Indications are that the income for 1957 will be similar to that of 1956.

### Major and Co.

Chemical manufacturers, tar distillers, etc., Major and Co. Ltd., declare a final dividend for the year ended 31 March 1957 of 7½ per cent (same) making a total dividend of 12½ per cent (same) for the year. Consolidated profit after tax is £38,072 (£33,781), less a minority interest of £7,159 (£8,525).

### Murex Ltd.

Outlook for the metallurgical company, Murex Ltd., is described as 'most encouraging' by chairman, Sir Arthur Smout. Group net profits in the year ended 30 April last dropped from £579,289 to £351,709. These were adversely affected by the continuous decline in the world price of wolfram which resulted in heavy losses on turnover of stocks, accentuated by a falling off in the demand for tungsten products.

## Market Reports

### DEMAND IS MORE ACTIVE

**LONDON** The demand for industrial chemicals on home account has been more active than in recent weeks and contract deliveries are being taken up in fair quantities. Enquiry for shipment continues at a good level chiefly for Commonwealth destinations. Hydrogen peroxide is finding a ready outlet and there is a good call for borax and boric acid. Prices for the most part are firm at recent levels with the chromium compounds moving well on the advance in quotations.

The call for the xylois and cresylic acid remains good on a steady coal tar products market.

**MANCHESTER** Most industrial users of heavy chemicals in Lancashire and the north-west, including most sections of the textile trades, are calling for steady deliveries under contracts and new enquiries from

Trading results were otherwise satisfactory.

With regard to the development of the less common metals—zirconium, niobium, tantalum and beryllium—the chairman sounded a warning stating that this must be influenced by factors beyond the company's control and that it might well be some years before they made an important contribution to the company's prosperity.

The chairman said that plans were now in hand for the erection at Rainham of a new plant for the production of pure tantalum and niobium powders. This plant was scheduled to come into production in 1959, and should be able to meet foreseeable user requirements for these products, current demands being satisfied by the output from the existing pilot plant. Demand for tantalum, though small, was stated to be growing, particularly in the electronics field and for use in chemical engineering. Niobium, besides being of interest in the field of nuclear energy, had possibilities for engine components. The company's pilot plant for zirconium had been expanded and the whole of the output was being sold in this country. Although detailed design work for a new large-scale plant has been completed, pending clarification of probable demand and availability of world supplies, no decision had yet been taken for the construction of a new plant. Murex's interest in beryllium was confined, at present, to the management of the UK AEA agency factory.

A high purity molybdenic oxide plant and a substituted extension to the tungsten carbide department were now nearing completion. Projects in hand include a new tantalum/niobium plant, and an extension to the main analytical laboratory.

### Vitamins Group

Group profit after tax of the Vitamins Ltd. for the year ended 31 March was £90,409 (£106,169). A dividend of 17½ per cent (15 per cent) is proposed on ordinary. In his annual statement, Mr. H. C. H. Graves, chairman, said that the company's main products, vitamins, were cheaper than ever before. This was brought about by increased efficiency and productivity in virtually all departments.

the home and export trades are circulating fairly freely. Firm price conditions are again reported, any uncertainty being still in respect of the non-ferrous metal products. A satisfactory movement of fertilisers continues, and a steady outlet is being found for most of the light and heavy tar products.

**GLASGOW** Considerable improvement in the Scottish heavy chemical market occurred during the past week. There has been a varied demand from most sections of the industry in regard to current demands and forward deliveries.

Although for the most part prices have remained fairly steady, some increases have been reported. A rather quiet position prevails on the agricultural side, while the overseas market continues to be fairly active.

# NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London WC2, price 3s. 3d. including postage; annual subscription £8.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period

## ACCEPTANCES

Open to public inspection on 16 October

Processes in which inhibition of the action of proteolytic enzymes such as papain is desirable. British Soya Products, Ltd. **784 831**  
Processes utilising the action of proteolytic enzymes such as papain. British Soya Products, Ltd. **784 832**  
Dissolving or dispersing metal naphthenates in liquid hydrocarbons, especially lubricating oils. Rhein-Chemie Ges. **784 780**  
Reduction of the free carbon content in titanium carbide. British Aluminium Co., Ltd. [Divided out of 784 695.] **784 697**  
Disinfectants and preservatives. Farbwerke Hoechst AG. **784 680**  
Fungicidal composition. Mosca, A. **784 706**  
Organic compounds of zirconium and their preparation. Farbwerke Hoechst AG. **784 852**  
Water-insoluble azo-dyestuffs. Farbwerke Hoechst AG. **784 781**  
Methyl steroids. Ciba Ltd. **784 855**  
Producing pigmented or dyed variegated artificial yarns. Rhodiatoc Soc. Per Azioni. **784 839**  
Production of selenium rectifiers. Siemens-Schuckertwerke AG. **784 782, 784 783, 784 784, 784 785**  
Self-supporting containers, of carbon or graphite. Conradty, E. K., Conradty, P., Conradty, M., and Conradty, C. **784 634**  
Aromatic oxygen-containing compounds. Imperial Chemical Industries, Ltd. [Cognate application 8065.] **784 681**  
Manufacture of compounds containing phosphorus. Ciba Ltd. **784 858**  
Chromium-containing monoazo dyestuffs. Farbenfabriken Bayer AG. **784 635**  
Dyestuffs and intermediates of the anthraquinone series. Ciba Ltd. **784 786**  
Cold separation of gas-mixtures. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. **784 747**  
Treatment of proteinaceous materials. Unilever, Ltd. **784 905**  
Catalysts. British Oxygen Co., Ltd. **784 638**  
Manufacture of terephthalic acid esters. Imperial Chemical Industries, Ltd. [Cognate applications 6896, 9733.] **784 791**  
Lubricants resistant to atomic radiation. Esso Research & Engineering Co. **784 793**  
Treatment of boiler feed water. Imperial Chemical Industries, Ltd. [Cognate application 28935.] **784 750**

Basic phthalocyanine dyestuffs and a process for their production. Farbenfabriken Bayer AG. **784 843**  
Dyeing process. Farbenfabriken Bayer AG. **784 844**  
Production of glass containing tellurium. British Thomson-Houston Co., Ltd. [Addition to 736 073.] **784 869**  
Method and apparatus for regulating the rate of supply of additives to materials being conveyed. Hedley & Co., Ltd., T. **784 870**  
Powder spray devices. Aerostyle, Ltd. **784 796**  
Production of cellulose from liquocellulosic materials. British Celanese, Ltd. **784 873**  
Process for washing or bleaching polyamide fibres. Deutsche Gold-Und Silberscheideanstalt Vorm. Roessler. **784 911**  
Lubricants. Regie Nationale Des Usines Renault. **784 876**  
Polyazo-dyestuffs and process for making them. Ciba Ltd. **784 879**  
Pastas for printing fabrics with pigment dyestuffs. Newby, H. (Chemische Werke Hülls AG.). **784 880**  
Uranium alloys. United Kingdom Atomic Energy Authority. **784 882**  
Soldering composition for aluminium. Horizons, Inc. **784 802**  
Ion-exchange processes. Permutit Co., Ltd. **784 758**  
Recovery of cooking liquor from spent soda pulping liquors. Sterling Drug, Inc. **784 650**  
Articles comprising boron nitride and refractory oxide and the manufacture thereof. Carborundum Co. **784 704**  
Apparatus for the catalytic cracking of hydrocarbon oils. Naamlooze Vennootschap De Bataafsche Petroleum Maatschappij. **784 888**  
Methods of separating metallic aluminium from slags and drosses. Maxworth Metal Products, Ltd., and Edwards, J. O. **784 884**  
Vaporisation of liquefied gases. British Oxygen Co., Ltd. **784 726**  
Refractory bodies containing boron nitride and a boride, and the manufacture thereof. Carborundum Co. [Addition to 742 327.] **784 705**  
Carboxylic acids. Kellogg Co., M. W. **784 727**  
Manufacture of finely dispersed organic or inorganic pigments. Farbenfabriken Bayer AG. **784 662**  
Continuous production of corrugated reinforced plastic material. Montecatini Soc. Generale Per L'Industria Mineraria e Chimica. [Addition to 748 368.] **784 732**  
Unsaturated ketones and a process for the manufacture thereof. Hoffmann-La Roche & Co. AG., F. **784 891**  
Piperidine derivatives and process for their manufacture. Sandoz, Ltd. **784 892**  
Use of certain methyl-ionone isomers in perfumes. Givaudin & Cie. Soc. Anon., L. **784 893**  
Therapeutic compositions and aqueous suspensions thereof. Upjohn Co. **784 659**  
Dyeing wool with metal complex dyestuffs. Farbenfabriken Bayer AG. **784 664**  
Synthetic plastics. Dynamit-AG. Vorm A. Nobel & Co. **784 920**  
Piperazine derivative and salts thereof, including penicillin salts thereof. Laboratoires Francais De Chimio-Therapie. **784 897**  
Metallisable trisazo dyestuffs and their

use. Geigy AG., J. R. **784 665**  
Dyeing and printing textiles and foils of organic esters. Sandoz, Ltd. **784 666**  
Amphoteric finishing agents from carboxylic acids and hydroxyalkyl amines, which agents are stable to high temperatures and the hardness in water. Badische Anilin- & Soda-Fabrik AG. **784 669**  
Heterocyclic quinones. Farbenfabriken Bayer AG. **784 670**  
Fibrous products comprising fibres bonded with dextran xanthate. Commonwealth Engineering Co. of Ohio. **784 671**  
Glass blowing device. Owens-Illinois Glass Co. **784 921**  
Improving the properties of shaped articles of film-forming polyethylene. Badische Anilin- & Soda-Fabrik AG. **784 923**  
Acid derivatives of ortho-naphthaquinone-diazide-carboxylic acids, particularly aromatic esters and aromatic amides. Kalle & Co., AG. **784 672**  
Organopoly-siloxane resin foams. Midland Silicones, Ltd. **784 826**  
Triazine vat dyestuffs of the anthraquinone series. Badische Anilin- & Soda-Fabrik AG. **784 926**

Open to public inspection on 23 October

Shaped carbon or graphite bodies of a high bending strength and high tensile strength. Farbwerke Hoechst AG. **785 283**  
Joining ceramics to metals. Birmingham Small Arms Co., Ltd. [Cognate application 7149.] **784 931**  
Hydroxyl compounds of the steroid series. Ciba Ltd. **785 018**  
Bonding of metal to moulded compositions. Bakelite, Ltd. **784 987**  
Process and apparatus for the production of iron granules. AG. Der Von Moos-schen Eisenwerke. **785 290**  
Cycloalkanone-oximes. Farbwerke Hoechst AG. **785 022**  
Extracting cellulose from cellulosic raw material. Vermeiren, T. I. S. **785 211**

## TRADE NOTES

Horace Priest Chemical Engineering Co. Ltd., Beverley House, London Road, Horsham, Sussex, have changed their name to Beverley Chemical Engineering Co. Ltd.

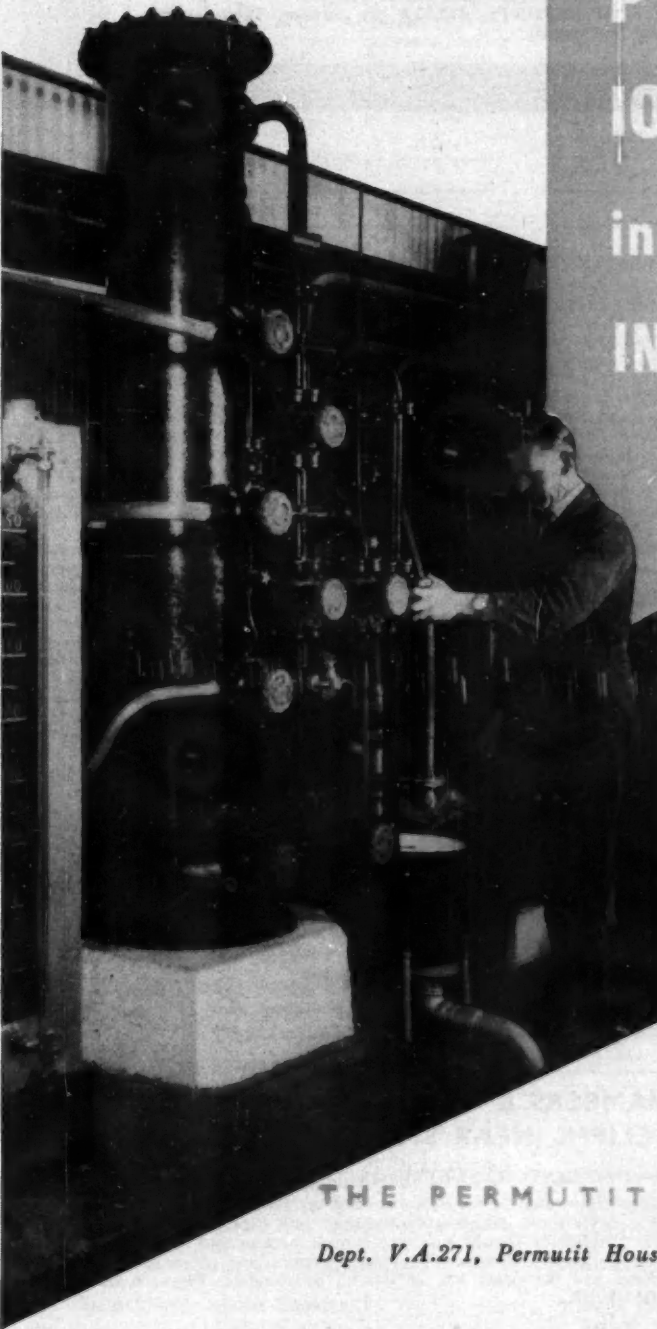
### Du Pont Distribution

E.I. du Pont de Nemours and Co. Inc., Wilmington, Delaware, US, and Brown and Forth Ltd., Clifton House, Euston Road, London NW1, announce that, as from 1 October 1957, the distribution of du Pont textile fibres will be undertaken by the Du Pont Co. (United Kingdom) Ltd., City Wall House, 84/90 Chiswell Street, London EC1 (Monarch 8201). Brown and Forth will continue to represent E.I. du Pont de Nemours for the sale of products of the organic chemicals and electrochemicals departments.

### Texas Instruments

Texas Instruments Ltd., new UK subsidiary of Texas Instruments Inc., Dallas, Texas, said to be the world's largest commercial manufacturers of germanium and silicon transistors, have just taken up occupation of a newly-built plant at Dallas Road, Bedford. The factory will be officially opened on 1 October.





# PERMUTIT ION EXCHANGE in the CHEMICAL INDUSTRY

Yet another application of Permutit Ion Exchange is the deacidification of formaldehyde, which is performed by the Permutit plant illustrated here. Increasing numbers of Permutit Ion Exchange plants are now being used to improve and accelerate many chemical and metallurgical operations. Perhaps in your industry Permutit can help to improve the product or reduce costs. For full technical information and advice, please write to :—

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## OFFICIAL APPOINTMENTS

### MINISTRY OF HOUSING AND LOCAL GOVERNMENT.

The Civil Service Commissioners invite applications from men for about twelve pensionable posts (a) six District Alkali Inspectors (b) six Alkali Inspectors under the **ALKALI, etc., WORKS REGULATION ACT, 1906**. Vacancies at Birmingham, Bristol, Cambridge, Cardiff, Leeds, Liverpool, London, Manchester, Newcastle-on-Tyne, Sheffield, Stoke-on-Trent. Considerable travelling: current regulations provide for first-class rail or car mileage allowance plus subsistence allowance. Candidates must be prepared to serve in any centre. Duties include the administration of the Alkali, etc., Works Regulation Act, 1906, as extended from time to time by Orders, to control the emission to air of noxious fumes, smoke dust, etc., from certain industries, to ensure the proper design, layout and operation of plant for this purpose.

The posts afford scope for initiative and individual responsibility. Inspectors will enjoy considerable freedom of action within their sphere, and will be expected to organise their work and to take decisions with the minimum of supervision. It will be an important part of their duties to establish and maintain good relations with industrial managements and local authorities in their areas.

Age on 1st August, 1957, posts (a) at least 35; posts (b) at least 30. Candidates must be University Graduates in Science or Technology and wide experience and knowledge of chemical or fuel technology and engineering and of related industries are essential. Candidates for posts (a) must have had about ten years experience and for posts (b) about five years. London starting salary for posts (a) £1,590 at 35 up to £1,780 at 38 or over, salary maximum £2,050; and for posts (b) £1,150 at 30 up to £1,280 at 33 or over, salary maximum £1,720. Slightly less for posts outside London. Exceptionally, higher starting pay at 38 (or over) or 33 (or over) respectively if outstandingly well qualified. Prospects of promotion. Five day week. Five weeks annual leave. Non-contributory retirement pension and gratuity. Application form and full particulars from the Secretary, Civil Service Commission, Scientific Branch, 30 Old Burlington Street, London, W.1, quoting No. S 4748/57. Applications to be returned by 30th September, 1957.

## OFFICIAL APPOINTMENTS: continued

### EXPERIMENTAL OFFICERS AND ASSISTANT EXPERIMENTAL OFFICERS

in various Government Departments. The Civil Service Commissioners invite applications for pensionable posts.

The posts are divided between following main groups and subjects (a) Mathematical and Physical Sciences, (b) Chemistry and Metallurgy, (c) Biological Sciences, (d) Engineering subjects and (e) Miscellaneous (including e.g. Geology, Library and Technical Information Services).

**Age Limits:** For Experimental Officers, at least 26 and under 31 on 31st December, 1957; for Assistant Experimental Officers at least 18 and under 28 on 31st December, 1957. Extension for regular service in H.M. Forces. Candidates aged 31 or over with specialised experience for Experimental Officer posts may be admitted.

Candidates must have at least one of a number of specified qualifications. Examples are Higher School Certificate, General Certificates of Education, Scottish Leaving Certificate, Scottish Universities Preliminary Examination, Northern Ireland Senior Certificate (all in appropriate subjects and at appropriate levels), Higher National Certificate, University degree. Candidates taking their examinations in 1957 may be admitted provisionally. Candidates without such qualifications may be admitted exceptionally on evidence of suitable experience. In general a higher standard of qualification will be looked for in the older candidates than in the younger ones.

**Salary (London):** Experimental Officer. Minimum £970 (women £894); Men's scale maximum £1,190.

**Assistant Experimental Officer.** Starting pay £385 (at 18) up to £685 (women £661) at 26. Men's scale maximum £850. Women's scales are being raised to reach equality with men's by 1961. Somewhat lower outside London. Promotion prospects. Opportunities for further education.

Further particulars from Civil Service Commission, Scientific Branch, 30 Old Burlington Street, London, W.1, quoting No. S94-95/57.

Interview Boards arranged at intervals, as required. Early application is advised.

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## SITUATIONS VACANT: continued

DEPARTMENT OF HEALTH FOR SCOTLAND  
CHEMICAL INSPECTOR

The Civil Service Commissioners invite applications for one pensionable post. Headquarters in Edinburgh, but travelling involved. Duties are those of Inspector under the Alkali Works Regulation (Scotland) Acts, 1906 and 1951, and to advise on such matters as the treatment of liquid trade wastes and safe disposal of radioactive wastes. Age at least 35 on 1st June, 1957. Candidates must have University degree in chemistry (ordinary physical or technical) and about ten years experience on production or applied research work in some branch of the chemical or allied industry. Starting pay (Edinburgh) (men) £1,541 (at age 35) up to £1,730 at 38 or over. Exceptionally, a higher starting pay at age 38 may be approved for an outstandingly well qualified candidate. Scale, maximum £2,000. Women's scales somewhat lower but being improved until equality with men's scale is reached in 1961. Further particulars and application forms from Establishment Officer, Department of Health for Scotland (Room 30) St. Andrew's House, Edinburgh, 1. Completed application forms should be returned by 30th September, 1957.

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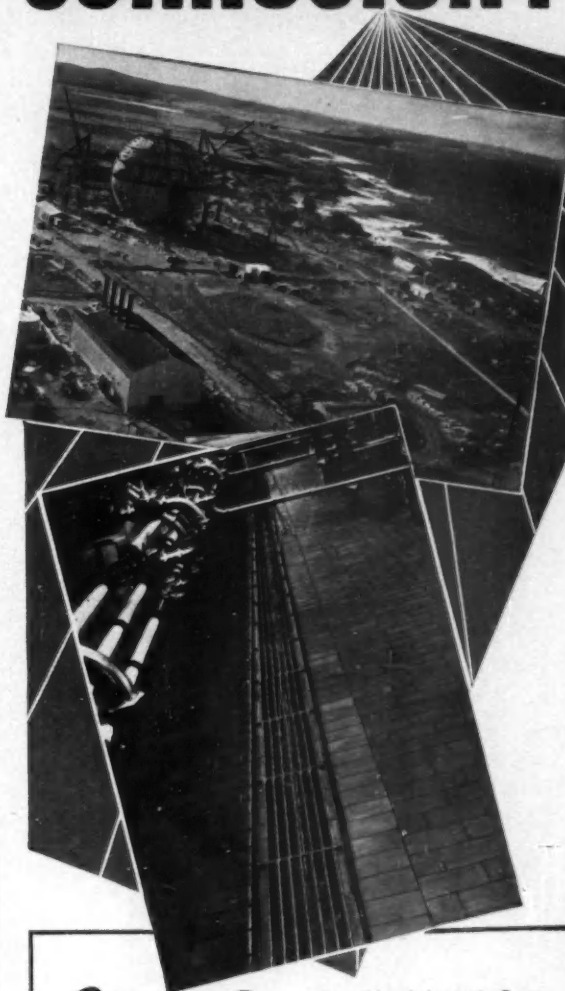
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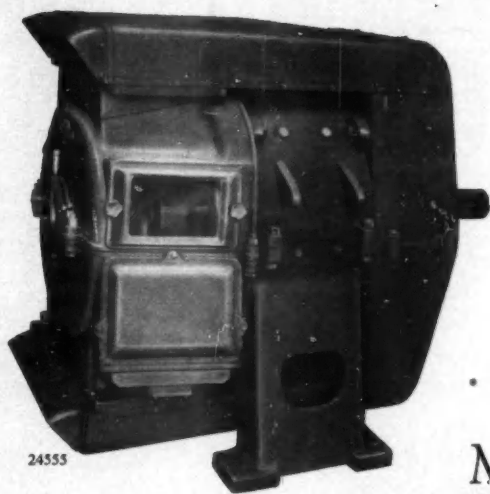
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